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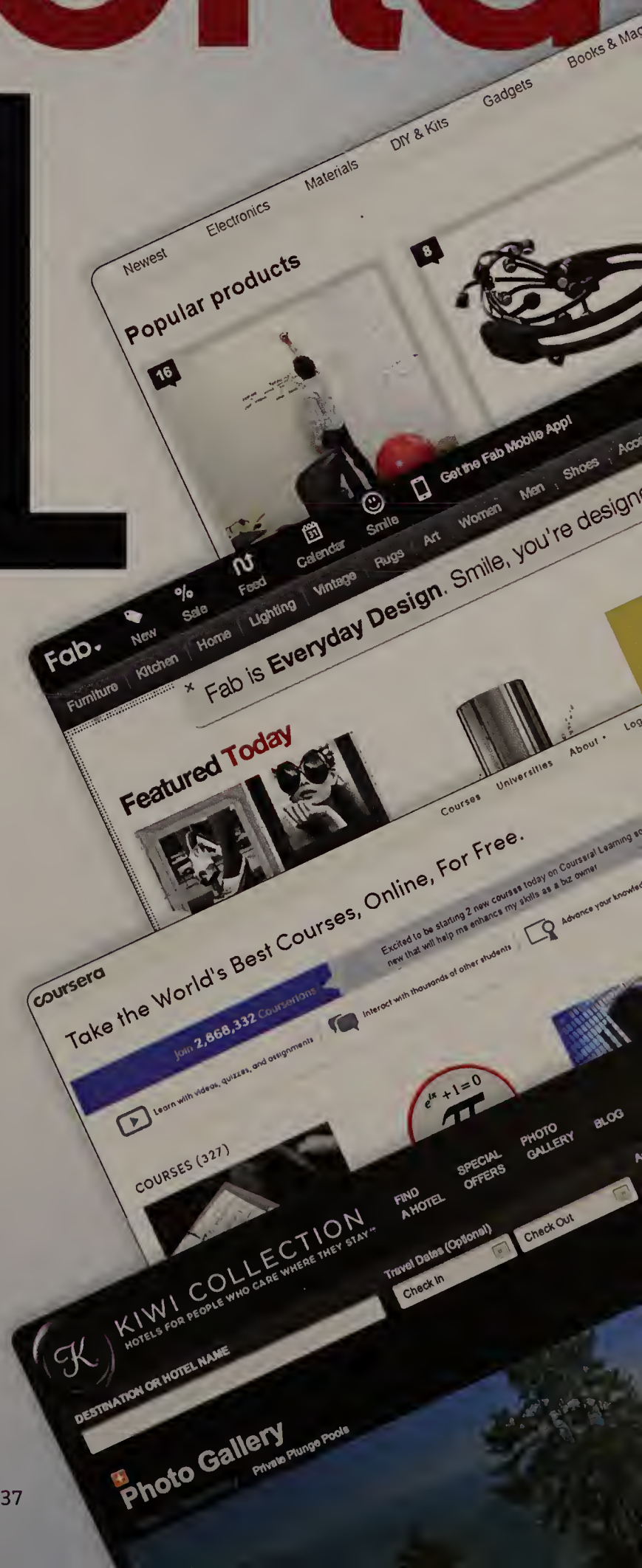
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FROM MAINSTREAM



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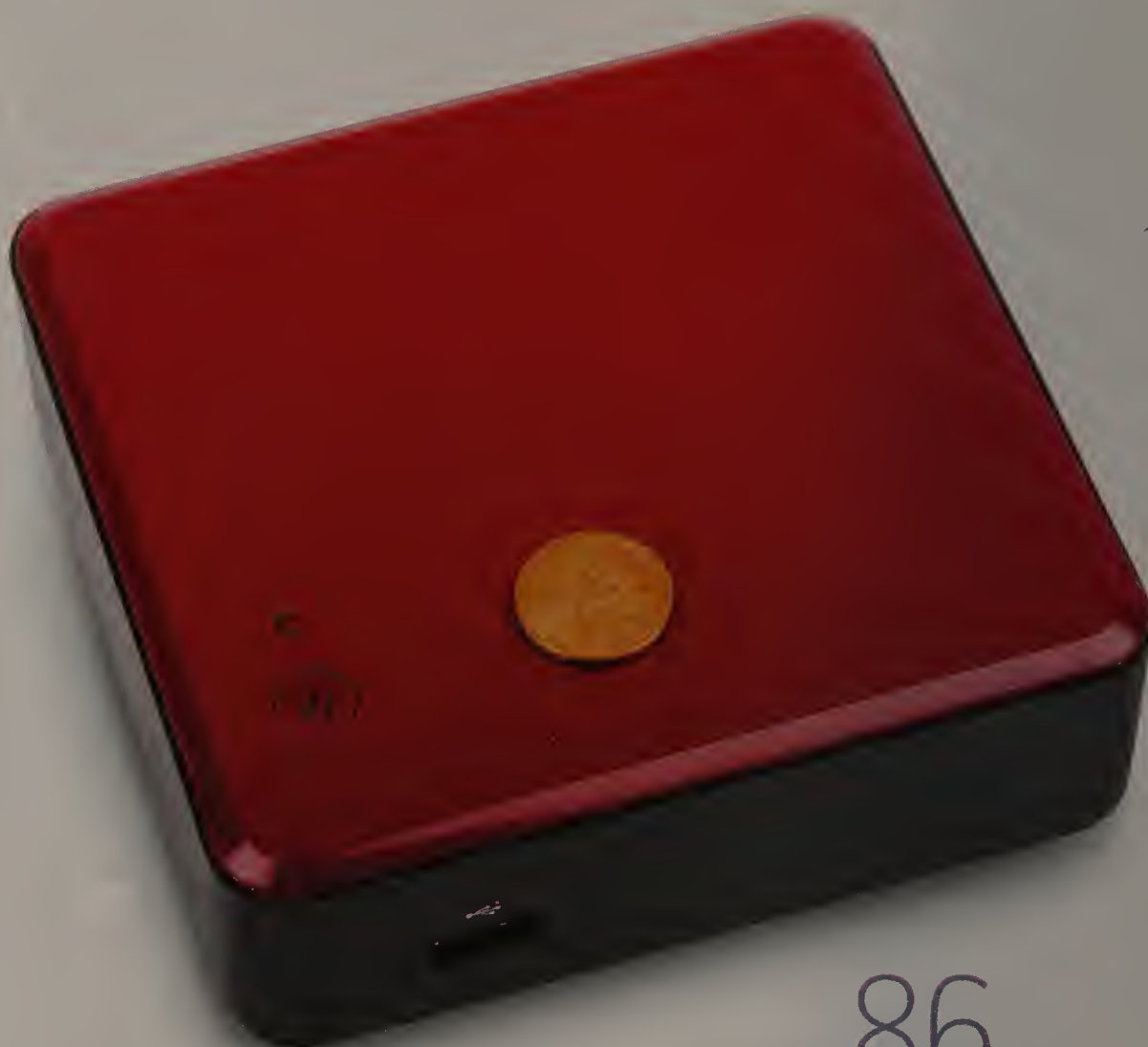
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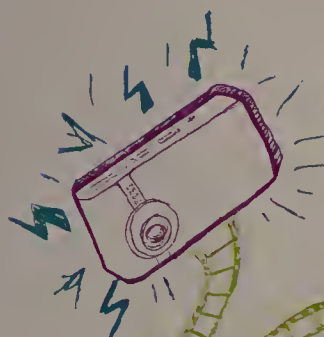
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MELISSA RIOFRIO

Scary Times for Online Privacy

YOUR ONLINE PRIVACY is threatened not so much by hackers and phishers, the perennial bogeymen of the Internet underground, as by people who work in big business. They want everyone's on-line data. And they want it more than the bad guys who make headlines do.

These companies aren't evil agents of destruction who would steal our identities for profit or erase our family photos for kicks. They want our data so that they can track us and categorize us. They want to use what they know about us to sell us something, or to sell what they know about us to someone else, all without running afoul of privacy regulations.

Trevor Hughes, president and CEO of the International Association for Privacy Professionals, put it to me succinctly: "Your data is the currency of the information economy." And our online activity is minting more money all the time.

Your Face and Place

Interested parties can use online data in many ways. *Contextualization* uses your data to customize "content" (read: ads) to your browsing habits and demographics. Targeted ads on Google already demonstrate this technology. But the data set that contextualization uses delves ever deeper. In a speech at the recent RSA security conference, Hughes told the crowd: "Not only are we going to have the sensitivity of where you've been online, but where you are in the world, and what you are doing and thinking."

Facial recognition will soon become another concern. Business entities may attempt to use tagged photos of you posted on social networking sites to find you wherever you are.

Forget hackers and phishers. Big business wants personal data, and your privacy is just a hurdle to be surmounted.

Do Not Track, a concept that the Obama administration promoted in its Consumer Privacy Bill of Rights last year, sounds great: Choose not to be tracked online, and websites won't be able to collect data about you. But because the federal government has yet to pass laws to support Do Not Track, big business can ignore it—and many companies plan

amount of data sacrifice. If you want all of the complex, nuanced benefits of social sharing, you have to share yourself. And you're probably already doing this, surrendering your data quite willingly.

Sporadic privacy imbroglios haven't made social networking sites, photo-sharing sites, and location apps like Four-square any less



Contextualization permits sophisticated business analysis of your personal data.

to do so, according to Hughes. The big problem for privacy professionals, Hughes noted, is, "How do you switch it off?"

Giving Your Data Willingly

Unless you're some sort of virtual exhibitionist, data tracking should scare you. But it's important to remember that the basic operating principles of our open Internet, where very expensive content is given away for free, require a certain

popular even though all of these services unmistakably gather information about us in order to increase revenue.

The more we live online, the more data we give away. Is it scarier that businesses are collecting our data, or that we're so willing to let them do it? ●

Senior Editor Melissa Riofrio tries to keep a low profile while covering online privacy and computer hardware for PCWorld.

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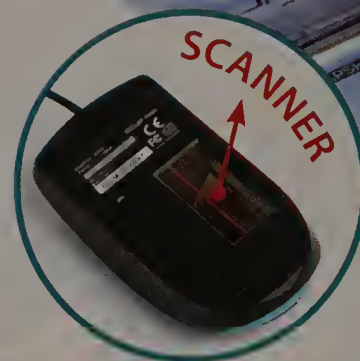
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Windows 8 remains extremely controversial among PC users, as responses to March's "Windows 8 Superguide" show. Perhaps inevitably, this radical revamp of a familiar operating system has thrown users into turmoil. But some say they like it—a lot. Send comments to letters@pcworld.com.



Fixing the PC Platform

Your March *Editor's Letter* ("30 Years Down, 30 Years to Go") listed three corrections to fix the PC platform. The first complained about boot time, saying we need a computer that will turn on as quickly as a TV. Well, all I can say is that the two pretty much have reached an equivalent level. I recently bought a new flat-screen TV, and since it makes a bunch of checks and links to the Internet, my TV now takes as long to start up as my Windows 7 PC does (which, incidentally, probably has the fastest boot time since my Heath/Zenith Z89 using CP/M).

Be careful what you wish for!

Barry Gottlieb, Oakland, California

Windows 8: Debate Rages On

Regarding "Windows 8 Superguide" [March]: Everything is hidden on Windows 8. It takes three times as long to use Windows 8 as any other Windows, even longer until you find out how to delete most of those pictures. Is it designed for slow readers? Or for children? Maybe they are copying Apple? Even turning the computer off is a mystery, and try finding the Control Panel! Thank goodness, I found the desktop and pinned the shortcut to the Start menu.

AlaskaArtist, PCWorld.com forums

I've read a lot of negative reviews of Windows 8, so it's time for someone to stand up for it. I'm really enjoying the completely new interface and learning all the nuances and different ways to use its new capabilities. The apps are fun. I can read hundreds of information outlets (news, sports, technical advice) all in one place. The OS is secure, and after a small learning curve, it's easy to master the interface. I'm discovering features such

as sharing information pages within apps with people on my contact list.

The Quick Access menu is great and makes it so easy to get to many critical apps and operations within the OS. My computer boots faster, the Start screen is nice to view, and the Search function is easy to use and spans any area of the PC or the app store.

I like Windows 8, and I hope it grows and improves, so let's get used to the next level of OS evolution.

Walt Smith, South Windsor, Connecticut

Windows 8 is apparently not the big hit that Microsoft had hoped for. However, Microsoft should not worry about that.

It will stop supporting Windows XP next year, then Vista, then Windows 7. And one day we will have to use Windows 8 or 9 or 10, and so on.

John Carter, Hampton, Virginia

"The Battle of the Pint-Size PCs" [Forward, March] reminds me of the 1982 Timex Sinclair proto-PC.

databaseben, PCWorld.com forums

As an electrical engineer, I would like to comment on your "three corrections":

1. Instant on: We have had "warm boot" on our TVs for years. Why not the same for our PCs? As long as I don't turn off the power, I should be able to simply bring it out of a sleep mode with a password

entry. Well, I can do that now, and that is very close to instant on.

2. Simple upgrades: Great idea, but the architecture of our products is changing so rapidly.

The motherboard that I bought a year ago cannot support the new lay-

outs for the architectural changes needed to handle the higher speed, larger memory, new consolidation of CPUs on a chip, and so on. We haven't reached a stable platform yet.

3. Seamless updates: Again, I agree, but there's so much software out there that I can't imagine how any upgrade can >>

possibly presume never to affect a computer. Every PC user configures and employs a system differently. I have written enough software myself to realize that the simplest error can cause significant havoc. I think that we are a long way from solving this one, too.

Todd Paulus, Vail, Arizona

30 Years of Tech Events

Too bad Apple, Microsoft, and Intel still stick in everyone's mind as the innovators of the past 30 years ["30 Years, 30 Great Tech Events," March]. Back in 1981, a British firm called Acorn released a personal computer called the BBC micro-computer that was far superior to any product on the market—full networking using Econet, dual-processor capabilities, and more. Acorn went on to create the

world's fastest desktop at the time with 4MHz of speed using a new chip design and a 4MB OS called RiscOS. That same chip design is now used in 95 percent or more of all smartphones and tablets.

I still run my computer IT business on an original Acorn Risc desktop running the very reliable RiscOS operating system.
visimp, PCWorld.com forums

The fastest 30 years in human history.

karthiq, PCWorld.com forums

Online Shopping

Your article about shopping online ["Online Shopping: 10 Tips to Avoid Getting Burned," *Consumer Watch*, March] missed one *big* safety measure. Many credit card companies have a free service that allows the cardholder to generate a

secure credit card number. In most cases this number can be used only once, and it cannot be stolen and used by anyone else.

Jim Rooney, West Jordan, Utah

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CORRECTION

IN THE APRIL *Privacy Watch* that discussed Facebook's new Graph Search tool, we should have said other Facebook users can't view your Facebook Activity Log, which includes a log of search queries.

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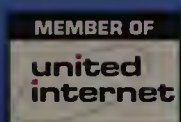
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Forward



Changes in the Wind for Windows 9

BY JARED NEWMAN

RUMORS ARE RIFE of a mid-2013 update to Windows 8 dubbed "Windows Blue." (See *Briefs*, page 15.) Microsoft declined to talk about how it might alter its OS, so we asked some experts to imagine possible ways forward.

Kill the Desktop

The desktop user interface is just one app among many on Windows 8's "modern-style"

It's too early to call Windows 8 a success or a failure, but it's never too soon to consider how the Windows platform will evolve.

Start screen. Windows 8's two-OSs-in-one model has led to some interesting hybrid devices such as Surface Pro, but it has also drawn jeers from critics who find the desktop-versus-Start-screen dichotomy jarring and confusing.

Tom Hobbs, creative director for Seattle-based design consultancy Teague, argues

that Microsoft should ditch the desktop completely, leaving only the touch-friendly side of Windows, with its walled garden of apps.

Committing to touch would create a clear path forward for users and developers, Hobbs says. It's not unlike Apple's transition from Mac OS 9 to OS X, an operating

system incompatible with legacy software in the absence of an emulation layer.

The key, Hobbs thinks, is for Microsoft to focus on positioning Windows as the best touchscreen OS for business. In this scenario, a modern-style version of Office for Windows 9 is crucial, but Hobbs can also imagine Microsoft reinventing desktop PC hardware with a focus on touch.

Regardless of how Windows 9 seeks to move beyond >>

the mouse and keyboard, success will depend on tight hardware and software integration, which is something that Steve Ballmer considers a priority for Microsoft, too.

Keep the Desktop for Diehards

Raluca Budi, a senior researcher for research firm Nielsen Norman Group, says that instead of providing a full-blown desktop environment, Microsoft could offer a compatibility mode for desktop apps within the modern-style interface. You'd still be able to run the full version of, say, Adobe Photoshop in a self-contained area, with its own windowing system. Meanwhile, another program, such as iTunes, would be confined to its own area. You wouldn't be able to run multiple programs side by side on a single screen; but you'd also have no separate Control Panel, no dueling versions of Internet Explorer, no separate file browser, and no taskbar—all features of Windows 8.

Budi's suggestion makes sense for Windows 9 tablets. But on a traditional PC, a full desktop environment works best, especially if you need to juggle lots of windows. So Budi offers an alternative approach: Disentangle the two interfaces. Don't send users into the modern-style interface when they're working on the desktop. Bring back a pop-up Start menu to

handle desktop functions and shortcuts. Don't let modern-style elements like the recent-apps list and the charm bar pop up along the sides of the screen, where they hinder window management.

If Microsoft plans to launch a Windows Blue OS this year, widening the gap between the modern and desktop ele-

ments may be a great short-term fix. Later, when the necessary software and hardware for touchscreen-based computing are in place, Microsoft can retire the desktop.

Update Modern UI Charms

As Nielsen Norman Group noted in a recent usability study, Windows 8 relies heavily on hidden commands such as the menu bar that you call up by right-clicking or by swiping up from the bottom bezel. Since users don't know what's in those menus until they bring them up—if they

know to look for them at all—the design wastes time and breeds confusion. Budi says that Windows 9 could provide visual cues to show the options hidden in a particular menu bar. Modern-style apps have plenty of white space at the bottom of the screen for text or partial icons that hint (at least) at

Put Windows Apps at Center Stage

Microsoft needs to do more to spur app development in Windows 9, according to Michael Cherry, lead analyst at Directions on Microsoft.

Whereas Office served as a role model for desktop application developers, illustrating the usefulness of concepts

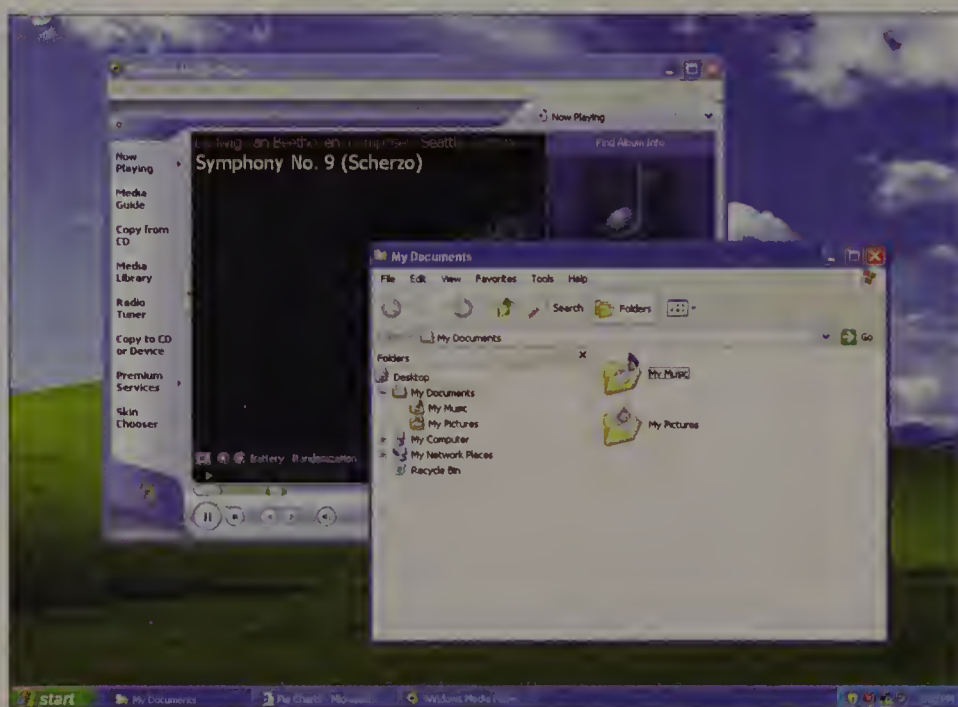
such as the icon bar and the ribbon interface, no similar source of creative inspiration exists in any of Microsoft's own modern-style apps.

"I have to conclude that developing apps for Windows 8 is hard," Cherry says. "So if they can't do it, how does an independent developer stand a chance of doing it well?"

Windows 9 must also find a way to combine the Windows and Windows Phone ecosystems. Doing so would mean less work for

developers, and it would signal to consumers that Microsoft was offering a greater ecosystem worth investing in.

If I knew that I could play a game for Windows Phone on a Windows PC and even on an Xbox 360 at no extra charge, I would be a lot likelier to buy the game. Apple and Google combined their phone and tablet platforms from the start. While Microsoft has done a lot to unify its phone and PC software with features such as SkyDrive integration and Xbox Music, those efforts only touch the surface of what is possible.



Microsoft's familiar (and much admired) Windows XP desktop.

the contents of the menu bar.

Another approach would be for Windows 9 to expose the relevant menu controls when a user opens the app, and then slide them out of view after a few seconds. "That signals to users that there is something hidden, and it also gives them an idea of what that may be," Budi says.

Microsoft might also make the charm bar easier to use. Moving app-specific settings down to the menu bar would help point users in the right direction, especially in combination with the visual cues that Budi suggests.

Why Google Created the Chromebook Pixel

WHAT WAS GOOGLE thinking when it dedicated R&D, manufacturing, and marketing to the Chromebook Pixel? (See the related stories on pages 46 and 47.) The Pixel isn't a cheap, simple portal to the Web like other Chromebooks. It has such features as a touchscreen with 2560 by 1700 resolution, an anodized aluminum chassis, and three noise-canceling microphones.

Early Chromebooks were a simpler, faster-booting, lower-cost, more-secure response to Windows PCs. Similarly, the Chromebook Pixel is a response to the MacBook Pro with Retina display. Like the MacBook Pro, the Pixel has a gorgeous screen (but with touch) and a premium design, but it costs \$200 less and offers a lifetime of software upgrades at no extra charge.

For most people, the difference in price isn't worth the loss of installed applications. But Google is anticipating a potentially big market segment of the future in targeting a growing sliver of people who spend all of their time in a browser and won't miss the apps. And even if Google doesn't sell many Pixels, the model opens the door for higher-end Chromebooks.

A Modernized Web or Convergent Google OSs?

The two most interesting elements of the Chromebook Pixel—its touchscreen and its high-resolution display—may help usher the Web into the age of touch and high pixel density.

On the other hand, the Pixel may mark a step toward merging Chrome OS and Android into a single operating system, to establish a more consistent user experience across devices. As the two OSs continue to share more features (such as Google Now notifications) over time, touch offers a way to improve the uniformity of the two interfaces.

But even if the Pixel is destined to play a crucial role in the future of Chromebook design, the merging of Google's two operating systems, or the role of the Web itself, it likely won't play a crucial role in stores. Though the \$1299 Chromebook Pixel may offer a tantalizing glimpse of what's next, it simply isn't priced to sell.

—Jared Newman

Google's Chromebook Pixel takes on the MacBook Pro.

BRIEFS

Adobe Flash Patch for Windows, OS X Systems

Adobe recently released an emergency update for Flash Player on all platforms after two zero-day exploits were discovered in the wild targeting Windows and Mac OS X computers. The vulnerabilities enabled hackers to hijack both Windows PCs and Macs. Adobe advises all users to update their systems as soon as possible. Adobe has also released updates for Flash Player on Linux and all versions of Android from 2.x to 4.x.



Chrome OS App Launcher for Windows Taskbar

Google is adding a new feature for Chrome so you can launch Web apps and Chrome standalone apps directly from the Windows taskbar without starting your browser. The new app launcher puts all of your Chrome apps under one icon on your taskbar. The official release of the app launcher should show up in the stable version of Chrome in the coming months.

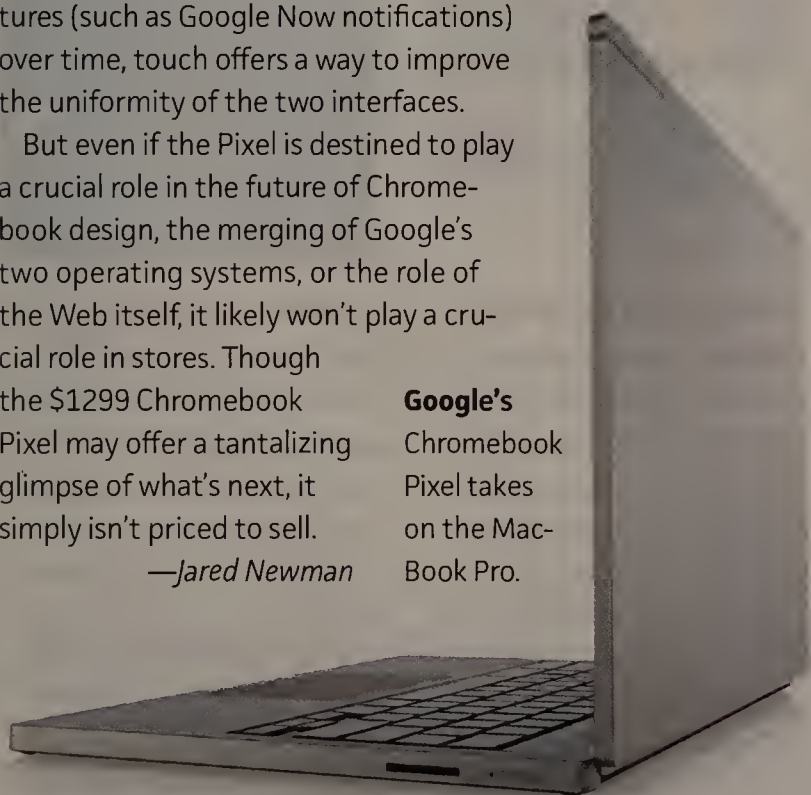
Is 'Windows Blue' a Set of Coordinated Updates?

Whether Windows Blue is an update, a feature pack, or a service pack, it reportedly will release Microsoft's flagship OS from its two- to three-year upgrade cycles, in favor of yearly updates. Now, ZDNet's Mary Jo Foley says that Windows Blue may encompass coordinated updates for Windows Phone, Windows Server, Windows RT, SkyDrive, and Outlook.com, too.



Seagate Drops 7200-rpm Laptop Hard Drives

Both X-bit Labs and AnandTech say that Seagate will stop producing 2.5-inch 7200-rpm hard disk drives, but that the high-performance, laptop-size drives should remain available for some time. Though Seagate does not currently offer a consumer solid-state drive, it did sign an agreement with DensBits in 2012 to co-develop consumer- and enterprise-focused SSDs.



Windows 8 Picture Passwords: Great Potential

THE LATEST EDITION of Windows is designed with touchscreens in mind, and includes features that make Windows easier to use on all devices.

Windows 8 picture passwords, for example, are a new, alternative password system that lets you log in to your device using a picture—or rather, a sequence of gestures performed on top of a picture—instead of a string of alphanumeric characters.

In a family photo, for example, you might sketch a line from one person's nose to the next person's nose. Such passwords aren't inherently better than alphanumeric passwords; but they are easier



Picture passwords consist of a sequence of gestures on a photo.

er to remember than a string of characters, and they offer roughly equivalent security.

Researchers at the University of Pennsylvania coined the term “smudge attack” in 2010 after successfully deducing gesture passwords for

unlocking Android phones from smudge marks left on the screen. We're likely to see a rash of new hacking techniques targeted specifically at touchscreen PCs, so if you're going to add a gesture password to your Windows 8

PC, make sure it's a good one. (For guidance on how to set up a picture password, see go.pcworld.com/picpass.)

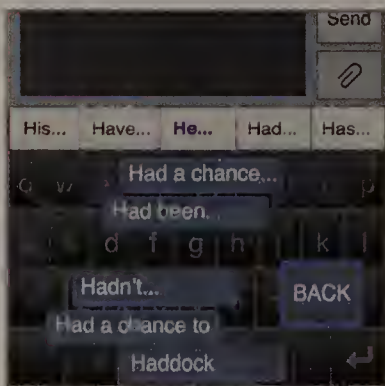
For maximum security, use circles and lines (not taps) exclusively. The security experts we spoke to about this process cautioned against using gestures that follow the contours of the image in predictable ways, such as by circling faces or drawing lines between landmarks. Instead, pick an image with strong contrast to create bright reference points, and devise a creative, convoluted series of gestures to make your password especially strong.

—Marco Chiappetta

TECH SPOTLIGHT: TOUCH-TYPING MOBILE KEYBOARD APPS



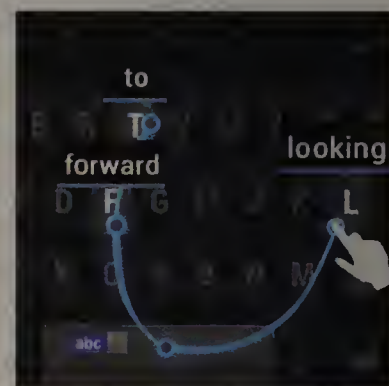
SWIFTKEY 4 One new feature of the \$4 SwiftKey 4 keyboard app for Android smartphones is SwiftKey Flow, which attempts to guess the word you want to type as soon as you touch the screen, and predicts your next word when you let go. The Flow Through Space feature lets you write a sentence without lifting your finger to add spaces. go.pcworld.com/swiftkey4



WORDLOGIC IKNOWU The \$2 iKnowU keyboard app for Android phones learns from your use patterns and remembers common phrases and words. iKnowU is very good at handling phrases or short sentences, and it guesses which keys you're likely to press next, highlighting them on the screen in bright green or blue. go.pcworld.com/iknowu



SNAPKEYS SI KEYBOARD (BETA) In this free app for newer Android phones, a see-through overlay on your display shows four buttons, each holding three letters that are very common in English. Tap them to begin typing. To use a letter or punctuation mark not shown, tap the space between the buttons for more choices. go.pcworld.com/snapkeyssi



TOUCHPAL KEYBOARD The free TouchPal Keyboard has letter-to-letter swipe technology, which predicts the word that you're trying to type. A new TouchPal Wave feature will also bring word-to-word swiping to the app: As your finger swipes over the keys, next-word suggestions will dynamically emerge out of the keys. go.pcworld.com/touchpal

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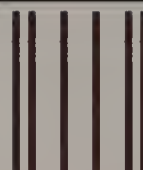
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60GHz Wi-Fi: The Future of Wireless Networking

GET READY FOR a huge jump in wireless networking speed. Two camps are competing to deliver wireless components that are at least seven times faster than today's gigabit (IEEE 802.11ac) routers. By harnessing spectrum in the unlicensed 60GHz frequency band, these devices may offer more bandwidth than hard-wired USB 3.0 connections.

The WirelessHD Consortium, led by chip maker Silicon Image, has been shipping products for more than a year. On the other side, the Wireless Gigabit Alliance (WiGig), led by chip makers Marvell and Wilocity, won't kick off its certification program until 2014, but one manufacturer is shipping an uncertified WiGig device early.

In its early stages, however, 60GHz technology will appear only in point-to-point networks, such as hardware for streaming media from a PC to an HDTV, or wirelessly connecting your laptop to a desktop docking station.

Last Side Standing?

Despite WirelessHD's head start, I think WiGig will win the battle. First, the IEEE 802.11ad standard defines WiGig technology, and most consumers are familiar with IEEE's earlier 802.11a, b, g, and n wireless-networking standards (802.11ac will be ratified in early 2014). Second, the WiGig Alliance recently merged with the trusted Wi-Fi Alliance trade group.

Still, having products avail-

able today is a tremendous advantage. WirelessHD devices such as the DVDO Air can wirelessly stream high-definition media point-to-point from a source to a display.

Plug a Blu-ray player's HDMI output into a WirelessHD transmitter, and connect a WirelessHD receiver to a video projector's HDMI input, and you can stream HD video to the projector without needing a 30-foot HDMI cable. Both the transmitter and the receiver are fairly large, however, and each requires an AC power supply. Perhaps even worse, the source and the destination must be in the same room.

60GHz Goes Mobile

Silicon Image, which acquired WirelessHD pioneer SiBeam in 2011, may be the first chip maker to solve the transmitter size issue. The company has developed a sufficiently small and low-power chip to work in portable devices. Silicon Image says its UltraGig 6400 transmitter can send 1080p video with multichannel audio from a tablet or smartphone to an HDTV or video projector. Samples of the chip have already reached some manufacturers.

The device is compatible with WirelessHD 1.1 receivers, but the chip is available only from Silicon Image, and

most device makers are reluctant to incorporate components that require them to depend on one small source.

First WiGig Product

Meanwhile, Dell has introduced the first retail WiGig product: the Wireless Dock D5000 (\$270). This dock is compatible with laptops carrying Dell's 1601 WiGig card, but the company's Latitude 6430u Ultrabook (\$940, including the card) is currently the only such machine.

Before you get too excited about the potential of 60GHz networks, you should also be aware of their Achilles' heel: range. A 60GHz signal can't easily penetrate walls. Also, oxygen molecules begin to absorb electromagnetic energy at this frequency.

Both the WirelessHD and WiGig camps are working on beam-forming algorithms that would focus 60GHz transmissions to alleviate the range issue. Instead of indiscriminately broadcasting the wireless

signal in all directions, as normal transmitters do, a beam-forming transmitter determines where the client is located, and then concentrates its transmission into a narrow beam that's focused directly at the client.

Combine a beam-forming transmitter with reflectors mounted on a wall, and you might be able to bounce a 60GHz signal down an indirect path—around walls and other such obstructions—to eliminate the line-of-sight requirement and increase the transmitter's range.

It will likely be a year or more before the 60GHz dust settles. But in the meantime, I can report that today's products based on the WirelessHD standard perform as advertised, though they generally have the line-of-sight limitations described above.

—Michael Brown



The DVDO Air uses a WirelessHD chip-set at 60GHz.

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¹ Based on IBM testing and documented in IBM System x® Virtualization Server Consolidation sizing methodology. IBM Flex System x240 supports 2.7X more Peak Utilization Virtual Machines (VMs) than previous generation BladeCenter® HS22V.

² Based on IDC white paper "The Economics of Virtualization: Moving Toward an Application-Based Cost Model," Michelle Bailey, November 2009, <http://www.vmware.com/files/pdf/Virtualization-application-based-cost-model-WP-EN.pdf>
Optional IBM Flex System storage node available fourth quarter 2012.

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Outlook.com Preps for Mass Hotmail Migration

MICROSOFT PLANS to move current Hotmail users over to its Outlook.com interface by this summer. Users' mail, contacts, and current account settings will come with them.

A Positive Outlook

Hotmail users will find a lot to love about the Outlook.com migration, starting with a clean, modern interface that's easier on the eyes than the crowded '90s-style appearance of Hotmail. Outlook.com also integrates with Facebook, Twitter, and LinkedIn so you can see updates from contacts right in your email window. If you integrated these accounts with Windows Live, the settings should migrate with you.

Outlook.com comes with such handy Hotmail tools as 'Sweep' and 'categories' for better message handling. The new service also integrates with other newly revamped online services from Microsoft, including SkyDrive and People, though not Calendar.

Microsoft says that you'll see 60 percent fewer ads on Outlook.com than on Hotmail thanks to social updates and messaging panes that take over space usually occupied by advertisements.

If you don't want to wait, you can migrate automatically by signing in with your Hotmail account at Outlook.com.

A new webmail service also means new beginnings, and what better way to do that than changing your old, dated Hotmail address to a sparkly new Outlook.com one? Microsoft offers such an option to convert your Hotmail address—though you might not want to do so if you're using a Windows 8 computer, a Windows Phone handset, or an Xbox.

change your email address using an alias. Like Hotmail before it, Outlook allows you to set up aliases (alternative email addresses) that can deliver email to the same inbox that your primary account uses. The beauty of this approach is that you can use your alias as your default address and still receive email sent to your old address. And if you ever get tired of your

down, select *More mail settings*. Next, select *Create an Outlook alias* under the 'Managing your account' heading.

Confirm that *Outlook.com* is selected in the drop-down menu, and enter the alias—***your.name@outlook.com***, for example—that you want to use. When you're done, click *Create an alias*.

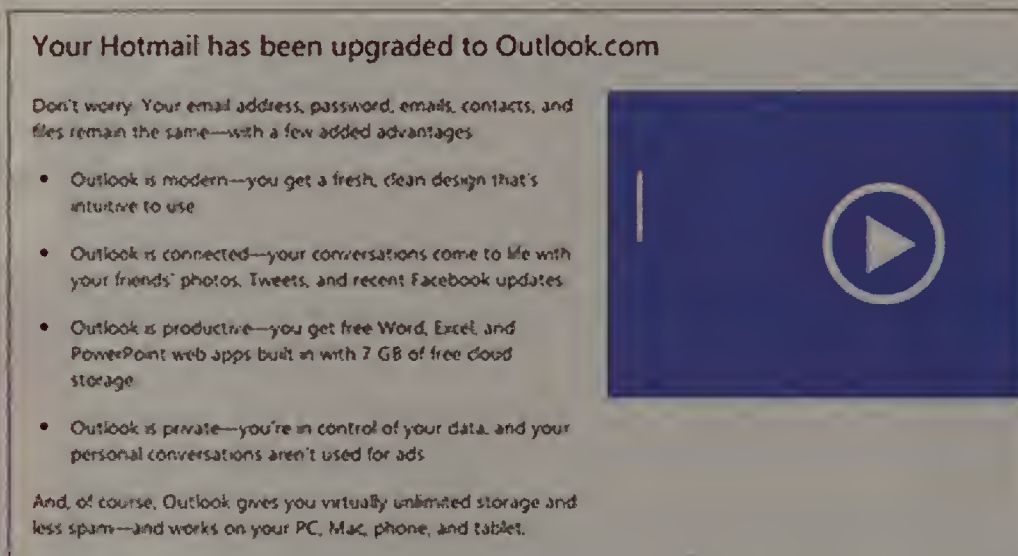
If the address that you're looking for is available, the program will take you back to your inbox, and Outlook will ask if you would like email messages sent to this address to go to a separate folder or to land in the inbox. Since you plan to use your new email address permanently, select *An existing folder: Inbox* and then click *Done*.

Now you have your brand-new email

address, but you still need to tell Outlook to send new mail from this address automatically and by default. Return to the settings cog and select *More mail settings* again. Go back to the 'Managing your account' heading, and select *Your email accounts*. Scroll all the way to the bottom of the next page; and under the 'Default From address' heading, select your new alias from the drop-down menu.

That's it: You're done. Now, all email you send from Outlook.com will come automatically from your new address.

—Ian Paul



Migrating your email service from Hotmail to Outlook.com is easy, Microsoft says.

Rename or Use an Alias

If your Hotmail address is also your primary Microsoft account and you use it to sign in to your devices, giving your email account an Outlook.com domain would require that you reconfigure your devices to log in to the new account. Windows Phone users will need to perform a factory reset on their handsets to do that, which will wipe all the apps and personal data from the phone. You can freely reinstall the wiped apps, but you'll lose the personal data if you don't back it up first.

A better alternative is to

new Outlook.com alias, you can trade it in for a new one reasonably easily. The downside is that you can't use your aliases from a smartphone app or a mail client like Windows Mail. In these situations, you'll have to use your primary Hotmail address to send mail. Outlook allows you to create five new aliases per year, to a maximum of 15 aliases.

Making the Move

To get started with an alias, log in to Outlook.com and click the settings cog on the upper-right side of your inbox screen. In the drop-down win-



Surface Pro Battery Life Extender?

EVEN BEFORE Microsoft's Windows 8 Surface Pro tablet launched, we knew battery life would be a weak point. Now, Microsoft is hinting that it may have a fix in the works: a new keyboard cover that has its own battery.

But would such an accessory compromise the Surface's design? The current Type Cover (which has mechanical keys) is already a bit clunky as a screen protector. Make it thicker, and the design hews closer to other clamshell-like hybrids, diminishing the appeal of the Surface as a tablet whose keyboard cover easily folds out of the way.

While the idea of a battery-equipped Surface cover is interesting, the possibility of altogether new Surface models is even more so. In a recent question-and-answer session on Reddit, Panos Panay, Microsoft's vice president working on Surface, hinted at more to come. (When asked about new models with additional features, Panay responded that those were "great ideas, but we aren't talking about future product designs.")

—Jared Newman

GEEK TECH

A Visit to Solidoodle's 3D Printing Factory

THE PRODUCTION line at Solidoodle's Carroll Gardens factory in Brooklyn, New York, is surprisingly small. The workshop may be the size of a typical loft apartment, but the manufacturing

occurs in a space 8 feet across and 12 feet high. There, 23 3D printers set up on two heavy-duty metal shelving units use hot, extruded plastic to create intricate objects.

Solidoodle CEO Sam Cervantes told us that all of the printers are hooked up to one controller computer. These machines have been working non-stop for more than a year, printing parts to use as components for building additional Solidoodle machines.

This is the sort of manufacturing future that Sam Cervantes imagines for the entire world. But the devices here aren't necessarily replacing humans: The rest of the space is filled with workers whose job is to assemble Solidoodle 3D printers. Aside from a machined frame and a couple of 3D-printed parts, almost every piece of the printer—from the extruding head to the controller board on the back—is assembled by hand.

The factory started up in September 2011 with just four workers. Since then, it has grown to a workforce of 60 employees and has shipped more than 4000 printers.

3D Printing Goes Global

In late February of this year, Solidoodle announced that it plans to open its first international 3D printing factory this summer in Moscow. A partnership with Linotech 3D, a Brazilian company, will be Solidoodle's first official non-U.S. distributor. Other markets in the company's sights include Belarus,

Canada, Japan, Kazakhstan, South Korea, and Ukraine.

Currently Solidoodle sells two 3D printer models: the Solidoodle 2 (\$500), and the larger, third-generation Solidoodle (\$800), which bumps up the build area by 2 inches on all sides for 8-square-inch prints. Both printers can produce ABS plastic creations that can print at an extremely fine resolution, with layers that measure a tenth of a millimeter thick.

On the domestic front, Solidoodle has partnered with Ensemble to launch a 3D Pavilion in Bryant Park in Manhattan. This tech center, located at 1150 6th Avenue (on the sixth floor), is being used not only for Solidoodle's 3D printing operations, but as a co-working space that will help entrepreneurs start their businesses. —Kevin Lee ●

The future of manufacturing may be closely tied to the future of 3D printing. We toured Solidoodle's plant for a peek at what's in store.



3D printers make 3D printer parts at the Solidoodle factory.



Visit the GeekTech blog at go.pcworld.com/geektech for hacks, tips, and hardware news.

Staff Picks

NEW PRODUCTS THAT HAVE OUR EDITORS DROOLING



Sony Xperia Tablet Z

The Xperia Tablet Z is the thinnest and lightest 10-inch tablet on the market, Sony claims. The device is just over 0.25 inch thick, and it weighs slightly more than a pound. This slate runs the Android 4.1 (Jelly Bean) OS, comes in black or white, and is waterproof for up to 30 minutes. Expect to pay \$499 for a 16GB model and \$599 for the 32GB version. go.pcworld.com/xperiaz

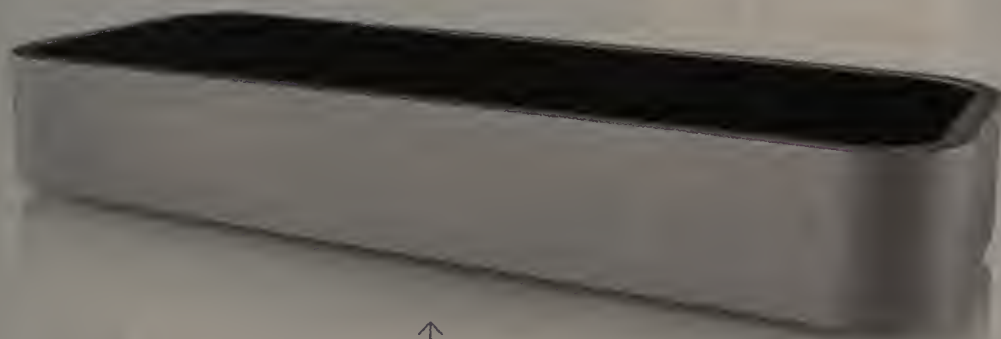


Ouya

The Android-based Ouya may be the future of home consoles. Though nowhere near as powerful as Sony's upcoming PlayStation 4 or the next-gen Microsoft Xbox, the \$100 Ouya costs only a fraction of the pricier game consoles. More good news: Ouya games will cost only a few bucks. A robust Android-gaming ecosystem is already in place, so developers shouldn't have trouble getting games onto the Ouya. Now available for preorder. go.pcworld.com/ouya

Samsung Galaxy Camera WiFi

Combine a proper point-and-shoot camera, the power of the Android 4.1 operating system, and Wi-Fi connectivity, and you have the Samsung Galaxy Camera WiFi. This camera comes with a 4.8-inch touchscreen and a 16-megapixel sensor, but it dispenses with the 3G/4G modem of the original \$500+ Galaxy Camera in favor of a more palatable (under \$500) price. Release not yet set. go.pcworld.com/galaxywifi



Leap Motion Leap

What Microsoft's Kinect did for the Xbox, Leap Motion's \$70 Leap gesture controller wants to do for PCs: change the whole game. Why type or flick a track pad when you can wave your hands through the air to slice fruit or fling birds? The maker says that the diminutive Leap is 200 times more accurate than existing motion-sensing tech. Available in mid-May. go.pcworld.com/leap ●

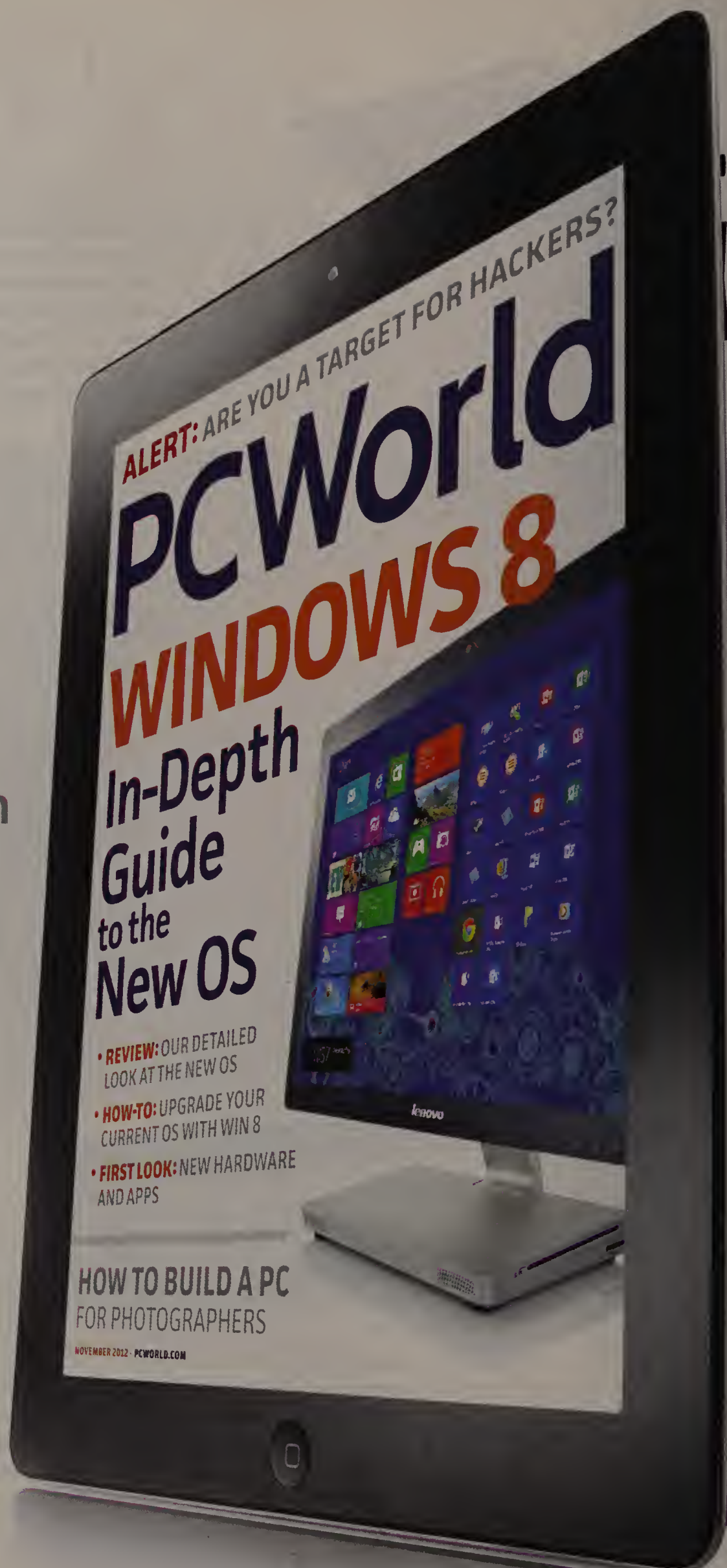
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Consumer Watch



How Companies Get You to Keep Buying New Stuff

BY CHRISTINA DESMARAIS

WHEN WAS THE last time a broken DVD player led to a trip to the repair shop? Even if you can find a repair shop near you, the cost to fix the device will probably be more than the price of a new one. The reality is this: We don't fix electronics anymore, we just replace them.

Experts call this a growing throwaway-electronics culture. While tech companies benefit from shorter product life cycles, the by-product can harm household budgets and the planet. Barbara Kyle, national coordinator for the Electronics TakeBack Coalition, says the drive for smaller, thinner products with hard-to-replace components is partly to blame. Also, companies that make electronics with short warranty periods are pushing people to trash their gear and not fix it. The end result: Electronics

Companies and consumers need to focus on durable products and recycling initiatives.

containing toxic substances are appearing in landfills around the world. Environmental group E-Stewards estimates only 11 to 14 percent of e-waste goes to recyclers; the rest ends up in landfills or is burned, causing soil, water, and air pollution. (For more, see "The Dirty and Dangerous Side of Tech," page 79.)

Products are often designed with difficult-to-replace parts. For example, critics admonished Apple in 2012 for gluing its lithium polymer battery cells to the aluminum unibody shell of the Retina MacBook Pro to reduce its size. Teardown site iFixit said this made repairs nearly impossible, and battery replacements would cost 54 percent more than on other MacBooks.

According to Best Buy Geek Squad agent Derek Meister, tablet and smartphone owners are also more likely to buy new gear rather than mess with a repair. If the warranty or service plan has expired, consumers just upgrade, says Meister.

Gear to Garbage in Record Time

Kyle and other observers say that inexpensive gadgets are showing up at prices people can't resist. When electronics are priced as impulse buys, though, too often they don't meet consumer expectations—or they break and end up in the trash, she adds. >>

Annie Leonard, founder of the consumer awareness campaign Story of Stuff Project, believes that people should avoid such mindless buying and chucking. She also advocates a solution in which manufacturers shoulder the responsibility for recycling their gear. "If all these old gadgets were their problem, it would be cheaper for them to just design longer-lasting, less-toxic, and more-recyclable products in the first place. They could even make them modular, so that when one part broke, they could just send us a new piece, instead of taking back the whole broken mess."

Manufacturer Initiatives

The Consumer Electronics Association has kicked off a number of industrywide e-cycling initiatives. Manufacturers have vowed to build greener products. The CEA has also launched an aggressive campaign with a goal to collect 1 billion pounds of e-waste annually by 2016. To help consumers buy gear that is environmentally sound, Greenpeace has created a ranking system, considering factors such as use of certified recycling partners, sale of products free of hazardous substances, durability of devices, and ease of repair. HP was the greenest last year, followed by Dell, Nokia, and Apple.

Many big tech brands also support recycling programs. Apple offers gift cards for old Apple gear. Dell's program has 2000 physical drop-off recycle centers and runs a mail-back recycling program for print supplies and hardware. Samsung allows you to print a prepaid postage label to send any old cell phone back to Samsung for recycling.

Other Recycling Options

The Environmental Protection Agency has an electronics donation and recycling site (go.pcworld.com/epawaste). And if your device still works, why not sell it? Plenty of sites buy used gear or offer trade-up programs, including Amazon, Best Buy, and eBay. There's always Craigslist, too.

ON YOUR SIDE

I RUN A small property-management business. Three years ago, I purchased QuickBooks Pro to help with the accounting. I use it once a month to update the accounts. This month, I got an error message when I tried to open it: "Fatal Error. QuickBooks has encountered a problem on startup. This may be due to an invalid software license." I reinstalled it after running the built-in repair program, but got the same error. I have a registered copy of this software, for which I paid several hundred dollars. I called QuickBooks Support and was told that since my software is three years old, I would need to upgrade for \$200. I don't need any new features, and want only what I paid for. Accounting software relies on a database to function. Once you start using the software, you are captive to it. Because of the data that has been input, Intuit is holding my company hostage. Can you help?—Don Moore, Houston



ANNE KANDRA

OYS RESPONDS: We contacted Intuit, and a representative apologized for the misunderstanding and identified the error message as resulting from a corrupt Windows or QuickBooks file. Although the company's support log could not find any record of Moore's call, the rep said that in such cases, the company would direct a customer to a utility on Intuit's QuickBooks support website to fix the problem. An Intuit customer care representative contacted Moore directly

to ensure that the fix was made to his satisfaction.

If you're unsatisfied with the response from tech support, don't hesitate to escalate your call. Politely describe your problem and explain exactly what you want. But first, double-check to ensure that your product is still covered.

Recall Alert: Samsonite Dual-Wattage Travel Converter

Samsonite is recalling its Dual-Wattage Travel Converter kit, which makes U.S. and Canadian appliances usable abroad. The converter can overheat if a load more than 50 watts is applied in the 50-watt setting, posing fire and burn hazards. The kit includes one black converter to change 220V AC electricity to 110V AC, two plugs with round prongs, two with flat prongs, and one grounded plug with three flat prongs. The converter has a red switch to adjust the wattage. The words "Dual-Wattage Converter" and "Do Not Use 50W on Hair Dryer" appear on the front. Consumers should immediately stop using it and contact Samsonite to return the product for a refund. Call toll-free at 800/382-7259 from 9 a.m. to 5 p.m. Eastern Monday through Friday, email recall@samsonite.com, or go to www.samsonite.com/recall.



✉ Have you run into a problem with customer service, a warranty, a rebate, or the like for your gear? Email us at onyourside@pcworld.com.

CyberPower recommends Windows 8

intel inside

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Beautiful, fast, fluid

Windows 8

SKEPTICAL SHOPPER

Are You Ready to Cut the Cable Cord for Good?

IF YOU'RE FED up with your cable company's skyrocketing bills, nickel-and-dime fees, lousy customer service, and inflexible programming, you're not alone. Video streaming services and set-top devices make it easier than ever to cut cable for good. One of the downfalls of ditching cable, however, is that it's harder—and sometimes impossible—to find current content such as news, weather, and especially sports. In fact, access to live MLB, NBA, NFL, and other games is what keeps many fans tied to their cable. It can also mean sacrificing first runs of popular shows.

Willing to be flexible? Start by making a “must-see” list, and decide how strongly you feel about staying current. Once you have a list of favorites, figure out where you can get the shows online. Most will probably be available via either a streaming service like Hulu or the network's own app or website. Sites such as Sidereel.com and TV.com offer listings, and tools that can help you locate online sources for most shows. Some networks, including HBO, Showtime, TBS, and TNT, offer their shows online through their own apps, but only to subscribers of participating cable services.

Unless you already have an Internet-enabled TV or you plan to watch on a computer or mobile device, you'll need a TV receiver. If you have a PlayStation 3, Wii, or Xbox 360 game console, you're ready to stream. Otherwise, the most popular set-top options are Apple TV, Google TV, and Roku. Each receiver has a different collection of streaming services, so choose the one that supports the content you want. Here's a run-down of the four leading services. All offer free trial periods.

Netflix: An \$8 monthly fee buys you access to thousands of ad-free movies and TV shows. You might not always find the most current content, but it offers a wide variety of genres. It also works on virtually every platform and streaming player, and on Android, iOS, Windows Phone, Kindle, and Nook.

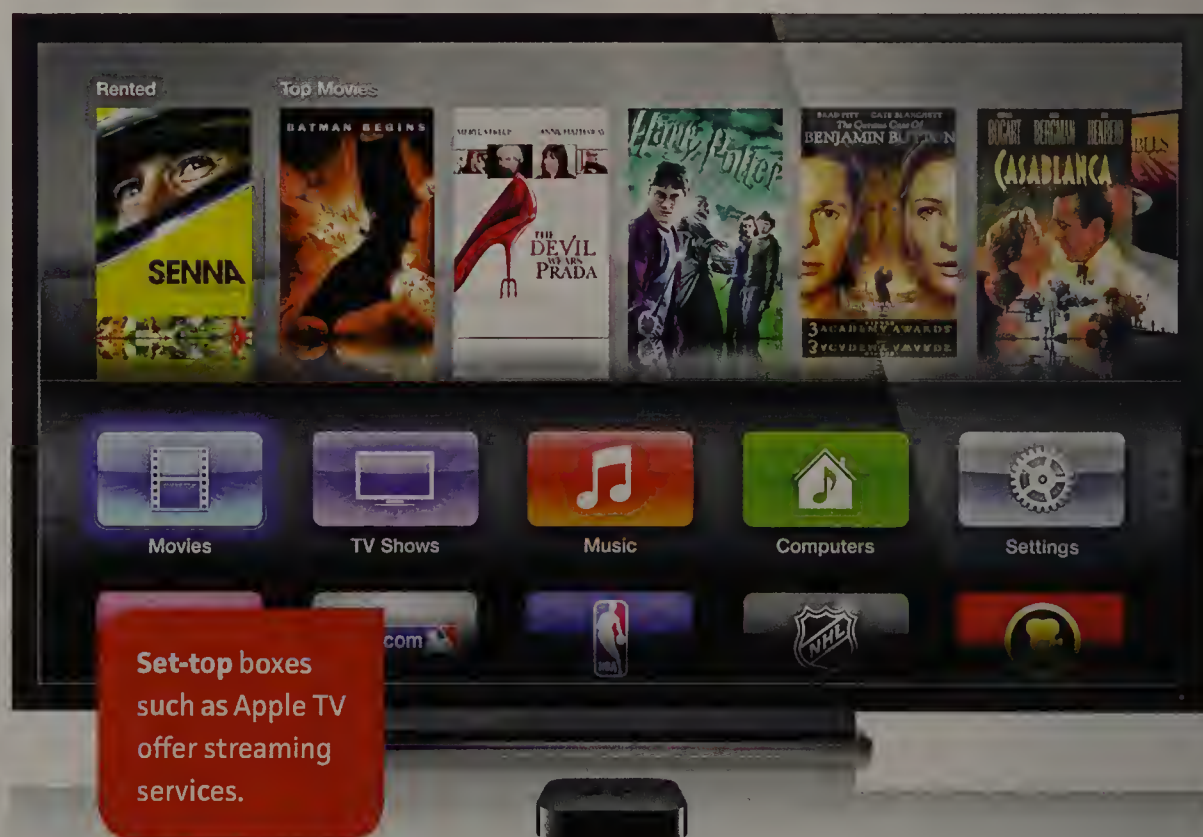
Hulu Plus: As with Netflix, \$8 a month gets you unlimited

Set-top options and online streaming services can be a viable alternative to cable's offerings if you tweak your viewing habits a bit.

access to movies and TV shows. Its content tends to be more up-to-date, but there's a catch: ads. It works with Apple TV, Roku, Android, iOS, Kindle, Nook, and game consoles.

Amazon Instant Video: Amazon's pay-for-content store offers 140,000 movies and TV shows. Movies cost \$3 to \$8 to rent and \$15 to \$20 to purchase; TV shows cost around \$2 an episode. Upgrade to Amazon Prime Instant Video for \$79 per year, and you get unlimited streaming access. It's available on Google TV, Roku, iOS, Kindle, and game consoles.

iTunes: Apple's store is similar to Amazon's, with TV shows priced around \$3 an episode; movies are about \$20. Content



selection is excellent, with lots of current stuff. But hardware compatibility is limited to Apple TV and iOS devices.

Still on the fence? Give your cable company a second chance. Run the numbers and see how much you would save without cable—and then see if your cable provider counters. Just beware of contracts and temporary rates that will shoot back up in a few months. If you're willing to tweak your viewing habits a bit, you'll more than likely save a few bucks going cable-free. —Anne Kandra ●



One Simple Change

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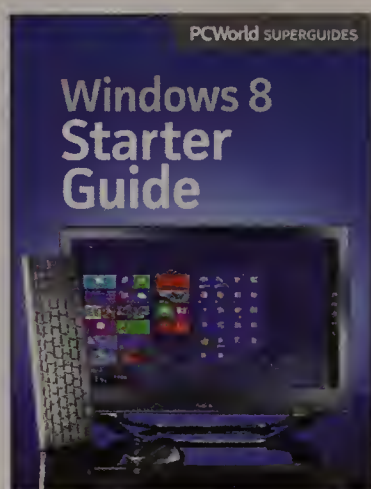
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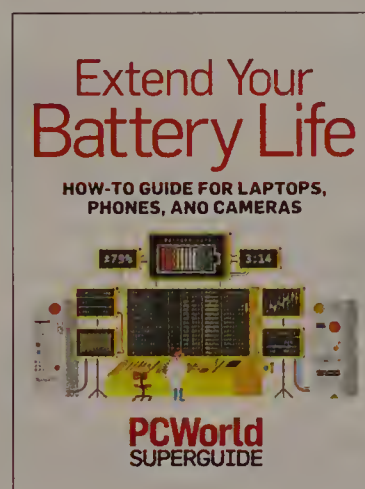
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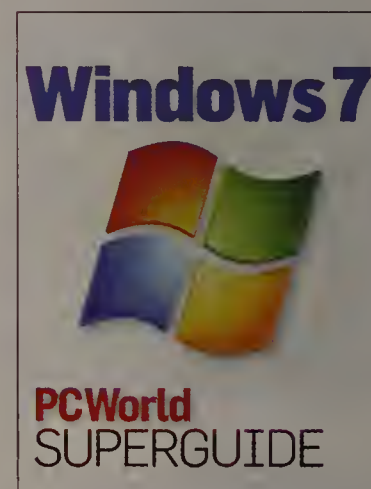
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Power Through Your Schedule With 15 Google Calendar Tricks

Whether you're a Calendar novice or a longtime user, these tips will give you even greater control and productivity.

BY ELSA WENZEL

THIS GUIDE WILL help you take control of Google Calendar, whether you're a novice or a power user. Most of the tips apply both to the free Google Calendar and to the one that comes bundled with a paid Google Apps for Business subscription.

Work Faster—and Focus

1. Use keyboard shortcuts: Google offers many keyboard shortcuts that can save you time. Most are pretty intuitive; for starters, press the letter C on the keyboard to create an event.

2. Find any date in a hurry: Visit the Labs via the gear icon. In the list that appears, enable *Jump to date*, and then click *Save*. Now the 'Jump to date' tool will appear to the right of your calendar, and you can punch in any day to do just that.

3. Customize calendar navigation: Go to the mini calendar to the left of the main calendar, and highlight the time frame you wish to see. Your main calendar will instantly adjust. To count your days in increments of, say, three weeks, click the gear icon on your calendar page, and in the General settings change 'Default view' and 'Custom view' to *3 Weeks*. Once you save, you'll see 21 days at a time whenever you open your calendar.

4. Oversee your agenda: If you're a power user with lots of shared calendars and appointments, the Day view can be hard on the eyes. To bring up a plain-text list of events for the day ahead, click the *Agenda* button above your calendar.

5. Dim less-important events: To make past and repeating future events look a little less vivid, click the gear icon, and on the Calendar Settings page find 'Event dimming'. Check *Dim past events* or *Dim recurring future events* (or both).

6. Hide weekends: To show just Monday through Friday, click the gear icon and select *Hide weekends* in the General settings.

7. Minimize all-day events: If out-of-office entries are clogging your calendar, click the tiny triangular arrow that appears below and to the left of the first day of the week. You'll see a synopsis such as '19 events' at the top, instead of a pile of text.

8. Keep work and play at your fingertips: To set up toggling between home and work calendars, click your email address in the upper-right corner of the Google Calendar page, and select *Add account*. Enter the details for your private Gmail address. When you click your email address in that corner, you'll see both accounts, and you can toggle between the two calendars. >>



Make Scheduling Smarter

9. Schedule an event in one line: You can add an event in one line of text, without using the full Create Event form. Start by clicking anywhere in your calendar; then fill out the text field. By default, any event lasts an hour if you name a start time without an end time, and it lasts all day if you don't list a time at all.

10. See when a colleague is available: Expand the *Other Calendars* drop-down menu to the left of your calendar to see a list of your third-party calendars. If your company uses Google Apps for Business, start typing someone's email address, and Google will autofill the rest. Select an email address or spell it out to see that person's color-coded appointments.

11. Check whether everyone can meet: Click the gear icon to visit the Labs. Scroll down, select *Enable* for the Smart Rescheduler, and click *Save*. In the calendar, select a meeting. In the Smart Rescheduler module, click *Find a new time*. Google will load and display the team's calendars. If your company uses Google Apps for Business, you will also see suggestions for available rooms in the building.

12. Hide events you're not attending: Click the gear icon, and in the General tab of Calendar settings, uncheck *Show events you have declined*. Under 'Automatically add invitations to my calendar', you can choose not to see those events unless you've accepted the invitation.

13. Let Google Calendar RSVP for you: Click the gear icon, enable *Automatically decline events*, and save. People who invite you to events at times when you're already booked will get an instant reply.

14. Don't miss the next meeting: Blare a reminder to yourself about your next meeting by adding a module to your calendar. To do so, visit Labs from the gear menu and click *Enable* for 'Next meeting'.

15. See who's free or busy: In the gear drop-down menu, choose *Labs* to enable the 'Free or busy' add-on. Type a colleague's email address there to get an always-on 'free' or 'busy' status message.

SIMPLY BUSINESS

Primer: Office for Windows Phone 8



NATE RALPH

The document editors on Windows Phone 8 handsets are among the most robust available on any smartphone.

THOUGH IT'S A far cry from the full-fledged tools offered in the desktop version, Office for Windows Phone 8 lets you perform basic productivity tasks on your mobile handset. The app has two panes: 'Recent' lists the files you've interacted with lately, and 'Places' lists the locations that

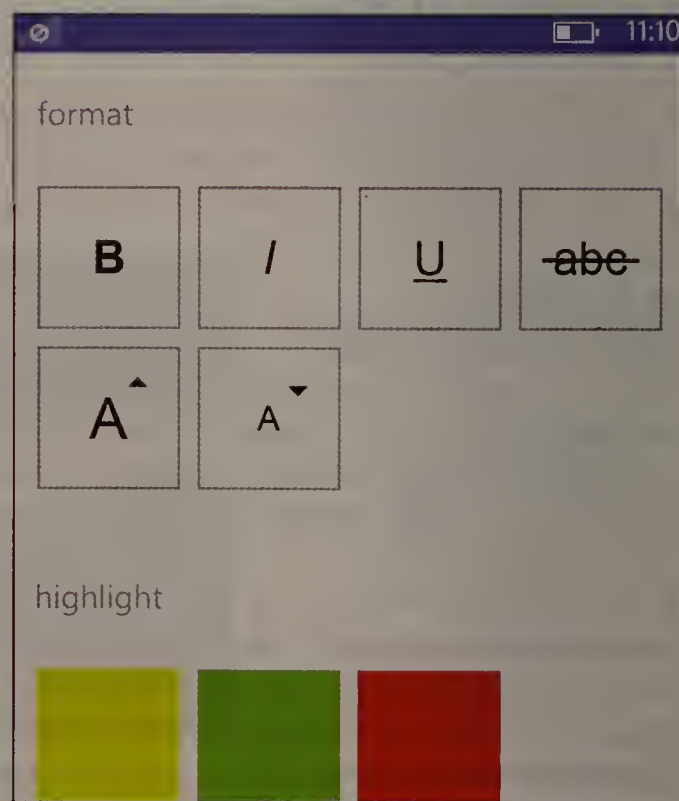
Office can search for your Word, Excel, and PowerPoint documents.

Microsoft Word: On Windows Phone 8, Word is fairly satisfying, though it offers few formatting options. Tapping the brush icon that sits in the menu tray lets you "paint" formatting options onto text you've selected. You'll find standard text options for bolding and italicizing, as well as for changing font size and colors. The tools aren't quite as powerful as Google's Drive offerings are, and you get no support for collaborative editing—unless you pay for Office 365. Still, if you're trying to do some work on the go, Word will suffice.

Microsoft Excel: In general, the Excel portion of the Office app has a simple yet attractive interface: A menu bar running along the bottom of the screen offers buttons for swapping between tabs on your worksheet, using the Auto Sum function, searching your spreadsheet, or sorting rows and columns. The bar is context sensitive. You can also freeze panes to keep rows visible;

add comments and format text; and add filters to your spreadsheet's columns. Excel on Windows Phone 8 isn't robust enough for exhaustive spreadsheet duties, but its support for basic files and SkyDrive makes it handy in a pinch.

Microsoft PowerPoint: The mobile iteration of PowerPoint is useful strictly as a way to view PowerPoint files. You can edit modern PowerPoint files (those sporting a .pptx or .pptm extension), but you can't create new PowerPoint presentations, and you're limited to altering text and changing the slide order.



Word for Windows Phone 8 offers limited formatting.



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TECH AUDIT

Monitor a Laptop or Desktop PC From a Mobile Device



MARCO CHIAPPETTA

IF YOU'RE STILL wasting time trudging over to PCs to perform routine maintenance on them, check for software updates, and power them down at night, you haven't gotten with the program. Here's how to check on your PCs from anywhere, and save your business both time and money.

Get started: A number of remote PC management utilities are available, but we'll focus on an excellent tool called PC Monitor (mobilepcmonitor.com), which is free for three PCs. It works with Android, iOS, and Windows Phone OSs, as well as with Windows, Mac OS X, or Linux.

Install PC Monitor: Installing and configuring PC Monitor requires just a few steps, and the default setup options should be sufficient. Install the appropriate application on each system that you want to monitor.

The first time you launch the PC Monitor Manager, it will prompt you to create an account for connecting your PCs to your mobile devices (or for monitoring the systems via the Web). At your first login, enter a computer name and a group name for the system.

Customize your counters: To configure a custom monitor or counter (for CPU use, say), click the *System* tab, and work your way through the tabs in that pane: *General*, *Services*, *Network*, and so on. The *Scheduled Tasks* tab lets you enable the monitor simply by ticking a task. Under the *Performance Counters* tab in the *System* pane, you can set up custom counters based on criteria that you specify.

Set up notification alerts: To get the most from PC Monitor and to have it notify you the moment something critical occurs, click

All it takes to get started is a smartphone or tablet, a data plan, the right app, and a few PCs in need of some love and attention.

the program's *Notifications* tab, and then click through the tabs in the resulting *Notifications* pane, enabling appropriate alerts as you go. These alerts may include when the computer starts up or shuts down, when particular users sign on, when someone plugs in a removable drive, or when a processor begins to overheat. More-advanced notification options may require you to set up rules manually.

Grab the PC Monitor mobile app: After installing the PC Monitor app on the relevant PCs, you must install and configure the companion mobile app on your mobile devices.

Select a PC: Upon signing in to PC Monitor, you should see a list of your systems. Tap a system name in the list to bring up an overview of the system.

Monitor your PC from your couch: If you've enabled notifications already, all that remains is to explore the mobile app for monitoring and managing your systems. PC Monitor will send alerts if necessary, but the mobile app also provides real-time data.

After you tap a system name in the left pane of the app, the right pane will become populated with system details and buttons for performing various tasks, including such options as opening a command prompt, checking for OS updates, and restarting the monitored system. In addition, you can use the PC Monitor mobile app to send messages back to the associated desktop PC, if you want to alert the PC's user.

After the application is installed on a system, the PC Monitor service runs in the background. During our testing, the service rarely, if ever, consumed a detectable amount of CPU time, and it used no more than 44MB of RAM. ●

The screenshot shows the 'PC Monitor' app interface. It has a blue header with the text 'PC Monitor'. Below the header are several sections: 'Account' with fields for 'Username' and 'Password'; 'Details' with a link 'View and change your account details'; 'Dedicated Server' with a toggle 'Use Dedicated Server' (currently off) and a field 'Dedicated Server Address'; 'Device Identification' with a field 'Name' (containing 'GT-P7510'); 'Notifications' with a link 'Change Sounds' (containing 'Click to change notifications sounds'); and 'Security'.

Setup options for the PC Monitor mobile app.

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That's why I protect it.

Nicolas - Novelist

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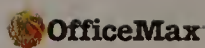
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Security Alert



Windows 8's New Security Features

BY ERIC GEIER

THE CONTROVERSIAL WINDOWS 8 introduces a few great features, some of which guard against malware and other threats. One feature, however, presents concerns that you must address to keep your PC—and your data—as safe as possible.

To take full advantage of the security functions built into Windows 8, your machine needs to run a new boot system called Unified Extensible Firmware Interface. UEFI, which replaces the archaic Basic Input/Output System (BIOS), adds a number of boot features and greatly speeds the startup process.

Included in UEFI is the Secure Boot feature, which helps to

The latest OS introduces certain protections. Learn how to take full advantage of them.

prevent unauthorized operating systems and malware from running at startup. This arrangement makes it more difficult for data thieves to use bootable discs or flash drives to access your files. It also helps to keep hard-to-detect rootkits from infecting your computer during bootup.

Some computer makers offered UEFI on select systems in the past, but Secure Boot requires a new version, namely revision 2.3.1. If your old system came with Windows XP, Windows Vista, or Windows 7, it probably either lacks UEFI or has an earlier version. Instead of trying to upgrade, you might want to buy a new PC or board that's designed for Windows 8, since such hardware must include UEFI and have Secure Boot enabled by default.

If you're technically inclined, you can check an older PC's UEFI-upgrade compatibility before you buy a new system. Try pressing the usual BIOS/setup key (such as <F2> or <Delete>) at boot; in the resulting screens, you can find the BIOS or >>

UEFI version. In Windows, type msinfo32 into the Start search field or the Run prompt to find the BIOS or UEFI version.

Microsoft Account Concerns

In Windows 8, you can use your email address to sign in to a Microsoft account that stores many of your settings, preferences, and saved passwords, plus browser history, favorites, and Windows 8 apps, on Microsoft's servers. Whenever you log on to a new Windows 8 device with this account, your data syncs.

Although the syncing can be useful, it also poses a security risk. If miscreants get your Microsoft-account password, they could log in from any Windows 8 PC and access your data. And if you use Microsoft's SkyDrive, they'll be able to access your online files. To protect yourself, use a strong, unique password when creating your account in Windows 8; if you already have a Microsoft (or Windows Live) account, you can log in with that instead. Also, avoid storing any truly sensitive documents in SkyDrive.

Fortunately, your saved passwords from Internet Explorer, networks, and Windows 8 apps aren't synced to a new system until you confirm it as a "Trusted PC." Once you sign in to a new Windows 8 system, Microsoft sends you email or a text message requesting that you confirm it. To make the confirmation process more secure, use a non-Microsoft email address for your Microsoft account, and use a different password for that email account (which you should be doing anyway). Enter your mobile phone number on your Microsoft account too.

Check for an Antivirus Utility

Finally, Windows 8 comes with built-in antivirus software as part of the updated Windows Defender program. If your PC manufacturer installed a third-party antivirus utility, however, Windows Defender may be disabled. Either way, confirm that you have some form of antivirus program installed and running.

BUGS & FIXES

Adobe Warns Against Careless Clicks



JAMES MULROY

Avoid tainted Flash files. Plus: Mozilla addresses memory safety flaws.

IN THIS MONTH'S fixes, both Adobe and Mozilla tackle an assortment of critical bugs.

Adobe: Six bulletins and advisories cover flaws in Acrobat, Flash Player, Reader, and Shockwave Player. For starters, a Flash Player patch (go.pcworld.com/adobe1304) addresses a critical bug that Adobe says is being exploited in the wild.

On Mac OS X, the attack comes as a malicious Flash file embedded on a website; the Windows exploit attempts to trick users into opening an emailed Word document that contains the tainted Flash file. The attackers can then execute arbitrary code on the computer or cause a denial of service.

Critical flaws in Reader and Acrobat that attackers are currently exploiting (go.pcworld.com/adobesa1302) could cause application crashes and allow the attackers to take control of your Windows system. For the attack to work, you would have to click a poisoned PDF file delivered by email, thereby allowing the remote attackers to execute arbitrary code on your PC.

Adobe has issued updates for most versions of Flash Player, Reader, Acrobat, and Shockwave Player on Windows, Mac, and Linux, and recommends that users obtain the latest versions. You should also be careful about opening emailed files, especially if you don't recognize the sender's address. For more, see www.adobe.com/support/security.

Mozilla: Of eight security advisories recently issued for Firefox, Thunderbird, and SeaMonkey, four are rated critical, two high, and two moderate.

One critical advisory addresses memory safety vulnerabilities in the browser engine of the three products (go.pcworld.com/mozilla1321). A denial-of-service attack could cause memory corruption and application crashes. With enough effort, attackers could execute arbitrary code on your system. In the past, Thunderbird and SeaMonkey typically haven't been susceptible to such attacks since they have scripting disabled by default.

Another bug, rated moderate, may let attackers access private information from process memory—the method through which an application encodes, stores, and retrieves data—by saving the data in an image file that they could retrieve later (go.pcworld.com/mozilla1322). Exploits of this bug could also cause a denial of service, such as an application crash or memory corruption.

The above vulnerabilities and more are patched in Firefox 19.0 and ESR 17.0.3, Thunderbird 17.0.3 and ESR 17.0.3, and SeaMonkey 2.16. To learn additional details, visit www.mozilla.org/security/announce.





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Evernote Issues Updates After Hack Attack



AFTER IT RESET the passwords of some 50 million users in early March, Evernote pushed updates to all its software products, according to a company spokesperson.

"We released updated versions of our applications ... to alert users to update their accounts with new, secure passwords and to make this process easier," Evernote's Ronda Scott said in an email. "This is the only change we have made to the Evernote clients in reaction to this attack," she added.

Affected programs include Evernote, Evernote Clearly, Evernote Food, Evernote Hello, Evernote Peek, Evernote Web Clipper, Penultimate, and Skitch.

Evernote reportedly identified hacking activity on its network on February 28, but it didn't alert users until March 2.

Evernote has yet to release information as to who might have launched the attack. Scott disclosed, however, that the breach did not result from a vulnerability in any of the company's programs.

It's still too early to talk about security changes the company may implement. Currently, in addition to monitoring for unusual activity, Evernote protects usernames and passwords with an encryption scheme known as "salted hash," which some breach fighters say is inadequate.

"While password hashing and salting can be effective at preventing attackers from working out your password ... it is far from solid protection," security expert Brian Krebs wrote in a blog post.

As usual, to protect yourself online, create strong passwords and don't reuse them across sites. Password managers take much of the pain out of the process.

—John P. Mello Jr

PRIVACY WATCH

Using the Personal Data Dashboard

Master these tools to stay abreast of how Microsoft is using your data.



ALEX WAWRO

IF YOU USE Microsoft products, some of your personally identifiable information is probably nestled on a Microsoft server somewhere. The Personal Data Dashboard, however, lets you control most privacy settings for Microsoft products. It lacks some features, but it's great for learning what Microsoft knows about you.

Head to data.choice.microsoft.com and log in with your Microsoft account. The Personal Data Dashboard isn't quite a one-stop shop (turning off search tracking requires you to log in to Bing, for example), but it's still in beta as of this writing, and Microsoft is adding features on a semiregular basis.

Begin with the My Profile section, which mostly consists of the details you chose to share at account creation. Click *Edit your profile in Windows Live*, and remove items you don't want to share. If you're more concerned about other users seeing your profile—while you're chatting with professional contacts in

Windows Live Messenger, say—use the Windows Live privacy settings page (go.pcworld.com/winlivepriv) to manage who can contact you or see your profile.



State Your Likes and Dislikes

Next, pop over to the My Data tab to see the identifying information Microsoft has collected about you. If you don't use many of the company's services, this page should be pretty bare, aside from the topics Microsoft thinks you're interested in.

This list helps to personalize your Microsoft account and tailor ads on any service that utilizes the Microsoft Advertising Platform. To add something, type it under the 'You said you like these topics:' label. You can specify topics you loathe by typing them under the 'You said you dislike these topics:' label. To opt out of targeted advertising, click *My Data*; then click the *Microsoft Advertising* and *Microsoft Email Communications* buttons until they show a red X and 'Not allowed'.

If you use various Microsoft services, check the My Data tab's Brands and Bing search history submenus. Adding favorite brands is fairly innocuous and should change only what ads you see while using Microsoft products, but your Bing search history could hold hints about where you live, your medical history, and your relatives and friends. To wipe those hints, click *Clear all*. To turn off search-term logging, go to Bing, click the gear icon at the top right, click *Search History* at the top left, and click the *Turn off* button.

For other controls, click the Personal Data Dashboard's *More Services* tab for links to privacy settings outside the purview of the new tool. ●

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Reviews & Ratings

12 Great PC Games for Any Age

Generation gap? What generation gap? Here are excellent games for your desktop that are timeless and fun for all family members.

BY ALEX COCILOVA

IT'S TIME TO obliterate the misconception that PC games aren't for everyone. The contradictory impressions of games as being "for kids" and "too violent" have isolated different generations of players, preventing them from enjoying what could otherwise be a spectacular bonding experience.

Sure, some games let us indulge our baser instincts, but plenty of other titles are innocent enough for impressionable kids, yet complex and fun enough for experienced players and grown-ups to sit down with and enjoy.

These 12 games represent just a handful of what's available, but they should be more than sufficient to help you introduce new players—whatever their age—to your favorite pastime.



Cooperative play means family fun in Trine 2.



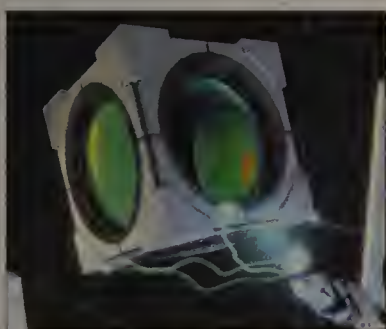
46 Chromebook Pixel



52 A7 AirPlay



53 Belkin N900



Portal 2

This beloved game franchise from Valve Software has captured the hearts and imaginations of players across all age groups.

Love puzzles? Put aside that old cardboard jigsaw and open up the space-time continuum for some mind-bending, physics-defying fun. Portal 2, a sequel to the original title, has minimal violence, unless you count the doings of a bumbling sidekick and a malicious AI (artificial intelligence) who mostly just attacks your self-esteem.

Portal 2 comes with a cooperative play mode, so you and another family member can work out the puzzles together. Just be aware that it will either make a great bonding experience or end in a trans-generational fistfight.

Cost: \$20; go.pcworld.com/portal2



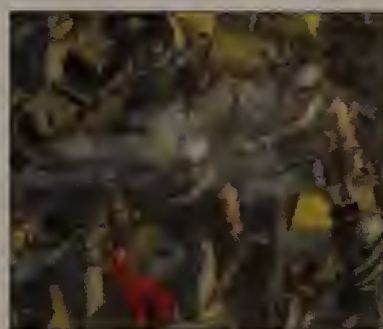
Minecraft

If you need to get in touch with your creative side, try two hours of Minecraft.

You may have heard that Minecraft is more of a playground or a sandbox than a traditional game, but it actually becomes whatever you make of it. You can adventure through caverns and mountains to fight monsters and collect resources, or construct lavish buildings. Players have created replicas of the Starship Enterprise, the *Game of Thrones* landscape, and even a simple computer that runs inside Minecraft using only the blocks found (or fashioned) in its world.

A nerd's paradise, it's also a worldwide phenomenon with no age limit. The violence is minimal, and opportunities for creative learning abound.

Cost: \$27; go.pcworld.com/minecraft



Civilization V

Sid Meier's Civilization series has always been a perfect marriage of strategy and history. The latest installment (V or 5) throws in gorgeous graphics and complex, turn-based gameplay mechanics.

You manage your own society and economy, controlling terrain to gather key resources and create defenses. The violence is nothing worse than the battle scenes you might see in a history book.

Civilization V is a game you can play for years to come.

Cost: \$30; a special edition, with extra content, is \$50; go.pcworld.com/civilizationV



Plants vs. Zombies

Fighting the undead with exotic flora may seem like an odd choice for all-ages gaming, but Plants vs. Zombies is a blast regardless of whether you eat prunes or Lucky Charms for breakfast.

This tower-defense game teaches the importance of critical thinking, resource management, and gardening when protecting ourselves from the zombie apocalypse.

The violence is light and comical, but the gameplay and challenges keep players coming back for more.

Cost: \$10; go.pcworld.com/plantsvzombies »



Tested in PCWorld Labs

Products reviewed in this section—both hardware and software—have been tested by the editors. Hardware goes through a formal, rigorous testing procedure in our lab.

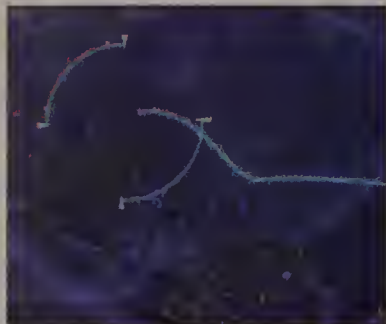


Orcs Must Die! 2

Stop Orcs from entering your world by any means necessary (but try to keep it funny).

Use an arsenal of weapons, traps, and magic spells while enjoying the sights and sounds of a frustrated enemy. The comedic theme, colorful graphics, and witty dialogue keep things lighthearted while the puzzling levels and diverse gameplay make it rewarding to come back to.

Cost: \$15; go.pcworld.com/orcs2



XCOM: Enemy Unknown

XCOM may be pushing the limit for younger players with its big, scary aliens and laser weapons, but the cartoonish style and sci-fi theme make it palatable. (You may want to put it on mute—it has some very minor swearing.)

The premise: Players control a small group of commandos who must defend Earth from invading aliens.

Cost: \$50; go.pcworld.com/xcomeu



Braid

Braid's story is as cryptic as its time-bending gameplay, but don't let that dissuade you.

It's as complex as the inner workings of a pocket watch. You can run and jump your way through beautiful worlds that look like watercolor paintings, but also rewind time to avoid fiery pits. (In fact, time will always rewind to prevent your death.)

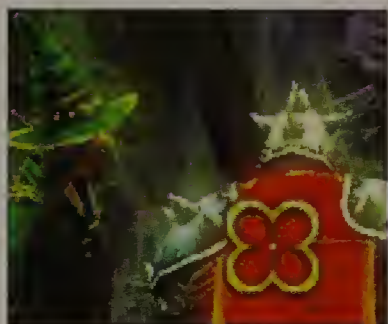
Fun, if a tad bewildering. Cost: \$10; go.pcworld.com/braid



FTL: Faster Than Light

Live out your childhood fantasy of being a spaceship captain with FTL, the first great PC game crowdfunded by Kickstarter. Your lone spaceship tries to traverse multiple sectors of space while evading a rebel fleet.

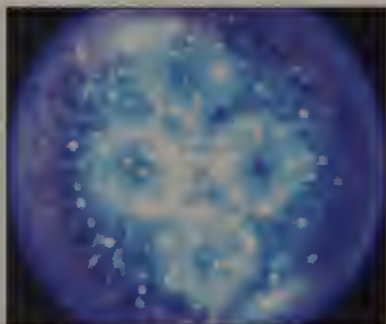
Violence is minimal; FTL challenges you with fast-paced gameplay and weighty tactical decisions. Two people (parent and child, say) could take turns running the ship. Cost: \$10; go.pcworld.com/ftl



Trine 2

If you have ever wanted to play through a family-friendly fantasy adventure with two other people, Trine 2 should be the game for you.

You take part in a symbiotic three-person ensemble of characters (a wizard, a knight, and a thief); teamwork and multitasking are key. No blood, no guts, just cartoon monsters and comic writing. Cost: \$15; \$20 for a version with extra downloadable content; go.pcworld.com/trine2



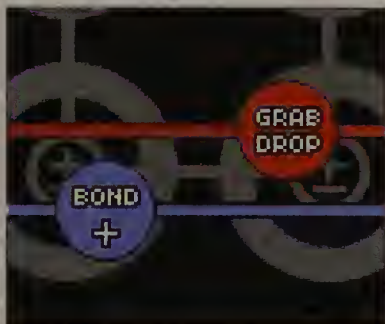
Osmos

If you're looking for something a little more relaxing, check out Osmos.

You play as a molecule or "mote" drifting in a primordial puddle, consuming smaller molecules to grow larger. (You could also become the prey of those larger than you.)

The gorgeous art style, calm music, and floaty, simple gameplay create a peaceful atmosphere.

Cost: \$10; go.pcworld.com/osmos



SpaceChem

Aspiring chemists and visual computer programmers will love SpaceChem, a serious test of your smarts and critical-thinking skills. You play a reactor engineer who must program remote manipulators to handle molecules on other planets—puzzles that could take days to work out. SpaceChem is difficult, but it's incredibly satisfying when you finish a puzzle.

Cost: \$10; go.pcworld.com/spacechem



Scribblenauts Unlimited

Here, you throw conventional logic out the window and let your imagination run rampant. When a magic notepad lets you create absolutely anything, how will you decide to stop a bank robber? Conjure up a simple cop, or go with a law-enforcing T. rex? Almost anything you write will appear, using the game's huge database of words.

Cost: \$30; go.pcworld.com/scribble

Digital Storm Bolt: Small Size, Big Performance

DIGITAL STORM'S BOLT doesn't intimidate in the way those enormous, glowing gaming PCs do, but don't let this system's slender profile fool you. This little monster stands ready to crush any game that gets in its way.

Design and Ports

Measuring just 3.6 inches wide, 14 inches tall, and 15 inches deep, this sleek system comes in white and gun-metal gray, and is free of decoration aside from the stylish black air vents and the logos.

The DVD drive resides at the front of the system, but two USB 3.0 ports, two USB 2.0 ports, and the microphone and speaker jacks sit inconveniently on the bottom right side of the case. Around the back are four more USB 2.0 ports, two USB 3.0 ports, two ethernet ports, and two antenna connections, along with all the audio ports and video outputs you could need.

The Nvidia GeForce GTX 660Ti graphics card can drive up to four displays using any combination of DVI-I, DVI-D, HDMI, and DisplayPort. However, given that the PC has so little room inside to add storage, it would have been nice to have an eSATA port.

On the Inside

Whether you're swapping out components or just evicting dust bunnies, you'll need to be careful when dismantling this intricate puzzle. Because you must slide the PC's entire shell off the back, rather than

just one panel, cables can get caught up in the process. So it's best to unplug the cables before removing the case.

Our review unit came loaded with a 120GB solid-state drive and a 500GB, 7200-rpm hard drive; that left barely enough space to fit one more SSD (or two full-size drives) as an eventual upgrade.

To keep things cool, nearly the entire motherboard is covered by the heat sink and a 120mm fan, which you'll need to remove to access the motherboard's single PCIe slot and its two DIMM slots.

Performance

Now for the number crunching. Equipped with an Intel Core i7-3770K processor and 8GB of DDR3-1600 memory, the Bolt cranked out a whopping score of 201 on our WorldBench 7 benchmark suite. That's more than double the mark of our baseline system—from a PC nearly half the size. And if you crave even more performance, the CPU begs to be overclocked.

The Nvidia GeForce GTX 660Ti graphics system produced impressive results as well. When we ran Crysis 2

and Dirt 3 tests at 2560-by-1600-pixel resolution, with each game's settings on Ultra, the Bolt averaged 54.1 frames per second on Dirt 3, and 28.0 fps on Crysis 2. While Dirt 3 looked silky smooth and nearly hit the coveted 60 fps, Crysis 2 struggled a bit but remained thoroughly playable. Taking the latter game's settings down to High produced an average frame rate of 44.6 fps, while dropping the resolution to a much more typical 1920 by 1080 pixels, with settings at High, resulted in an average frame rate of 80.6 fps.

When you put high-end components in a tiny package and run them hard, heat usually becomes an issue.

But the Bolt's fans and vents kept it both cool and quiet. I had it running right next to me, at ear level, for an entire day and barely noticed its noise signature.

Bottom Line

Digital Storm's Bolt packs impressive power into a slim, sexy package. Getting inside is a bit of a headache, but you shouldn't need to upgrade this rig for quite a while. The Bolt is a great choice for a PC gamer who has a small room and a small budget. It will fit anywhere and play anything, and it's very nicely priced at \$1599. —Alex Cocilova

★★★★★; \$1599;

Digital Storm;
go.pcworld.com/dsbolt



The Bolt's powerful components are packed in tightly.

Google's Chromebook Pixel Is an Expensive Idea

THE CHROMEBOOK PIXEL is an idea. It describes Google's vision of a high-end laptop for citizens of a future world, one freed from the encumbrances of old-style computer operating systems, existing entirely on the Web. The Pixel is as solidly built and generously appointed as any laptop you'll find, but it runs only Google's Chrome Web browser, not Apple's Mac OS X

or Microsoft's Windows.

Until now, Chromebooks were cheap, plasticky econoboxes, positioned as secondary machines. The Pixel is nothing like that. But it's also hard to fathom how the Pixel works as a real-world product.

Google's Vision: Gorgeous

The Pixel is a solid, aluminum-bodied laptop, weighing a fair-

ly light 3.35 pounds. In many ways, it looks like something you would find in an Apple Store. Its display is beautiful, with a resolution of 2560 by 1700 pixels and a density of 239 pixels per inch. As with Apple's Retina display, photos are fantastically detailed, and text is crisp. The screen has an aspect ratio of 3:2, which is better for reading webpages than a widescreen model.

The display also functions as a touchscreen. As long as you're reaching over a keyboard, a touchscreen is never going to be a primary input method on a laptop, but it's a

nice addition to the touchpad. When swiping between images, I noticed that scrolling seemed laggy when I used my finger, but crisp when I used the Pixel's keyboard. As I typed on the backlit, Chiclet-style keys and used the large black-glass multitouch touchpad, I was once again reminded of an Apple laptop.

The Pixel's connectivity options are minimal: You get just two USB 2.0 ports, a Mini DisplayPort for video-out, a standard headphone jack, and an SD Card slot.

Higher-End Model Includes Verizon LTE

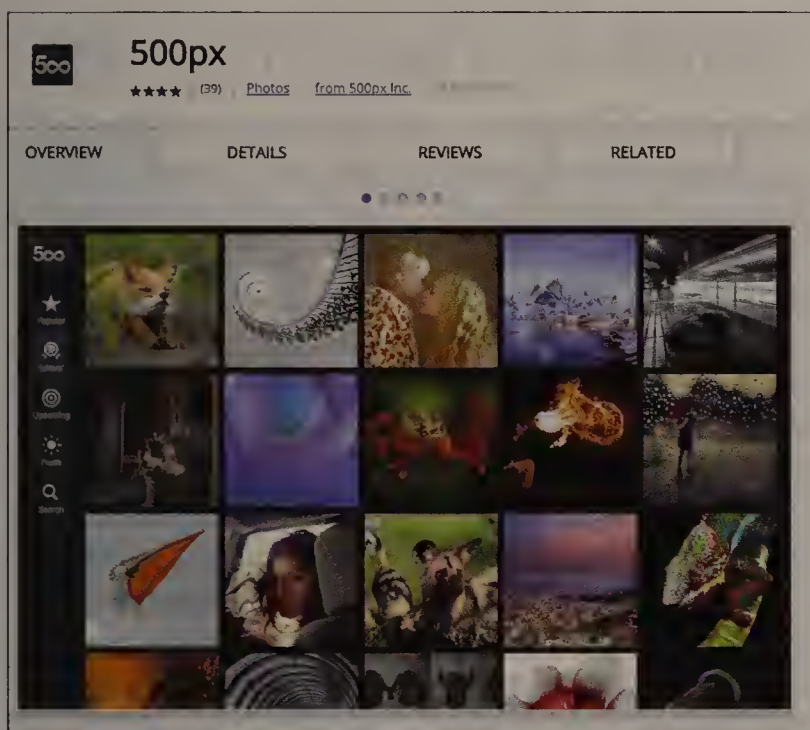
Driving the entire experience is a dual-core Intel Core i5 processor running at 1.8GHz. That's far more power than any other Chromebook can boast. The Pixel posted competitive times in our HTML5 gaming, JavaScript processing, and other tests—even compared with some full-fledged laptops. But this power (and the display) taxed the battery, which lasted just over three hours in our tests.

The higher-end Pixel is designed for cloud-based computing. Consider the 64GB of solid-state storage to be there just in case. More important is the Pixel's integrated 4G networking, which

The Pixel resembles an Apple laptop.

Google's Chrome OS is the brains behind the Pixel's beauty—and therein lies the problem.





On the Pixel's stunning display, images are beautifully detailed.

comes with two years of Verizon LTE service and 100MB of data per month. With the exception of a couple of airplane flights, I was able to use the Web anytime, anywhere. The \$1299 version of the Pixel comes with just 32GB of storage and no 4G networking.

The Rub: Chrome OS

The Pixel may be beautiful, but Chrome OS is the brains behind the beauty, and therein lies the problem. Chrome OS is Google's attempt to move beyond traditional operating systems: *Everything* in this environment happens in a browser tab. Most prospective buyers—especially those who can afford the Pixel—probably aren't yet Web-centric enough to make the shift.

If all Web apps were as good as Google's, there would be a stronger case to make for Chrome OS. Unfortunately, the Chrome Web Store is a mélange of truly impressive Web apps and glorified

bookmarks—and it's often hard to tell which is which.

Chrome OS could also stand to manage its tabs better. If I have a Gmail tab open and I click the Gmail icon on the dock, it opens a duplicate tab. Chrome OS supports separate full-screen workspaces for different apps, but I was doing a lot of unnecessary work moving tabs around manually.

Bottom Line

Google has done a great job of making its apps work offline—I'm writing this paragraph offline, in Google Docs, at 40,000 feet. But some stuff just doesn't work offline. For most people this will be an issue, at least for a while.

As an idea, the Chromebook Pixel has a lot going for it. But as a product, it's simply not practical yet. For the time being, it's just an expensive curiosity. —Jason Snell

★★★★☆; \$1449; Google; go.pcworld.com/chromebookpixel

How I Survived Chromebook Exile

I SPENT A week living off the Chromebook Pixel as much as I could. I quickly realized that those who compare it to a full-fledged Windows laptop are missing the point—or the boat. Millions of people have already discarded PCs, using their tablets and even smartphones for many common computing tasks. Despite some limitations, Chromebooks offer a more functional alternative for living the increasingly typical online life.

Roadblocks at Work

I thought I could handle everything through Google Docs, but roadblocks arose on my first morning. I wanted to work on the train, but the Offline function was not enabled for my corporate Google account. I had to move my work to my personal Google account in a hurry.

When I arrived at the office, our network didn't recognize the Chromebook. The guest network gave me Web access, but I couldn't access our servers. So I lived a double life, creating files with my personal Google account and then sharing them with my professional Google account. It sounds clunky, but it actually simplified my life to have my work available from any connected PC or Chromebook. Turning to my work PC for the corporate apps I couldn't avoid felt onerous. Plus, I loved using the gorgeous Pixel.

The Meaning of the Pixel

Is the Pixel overkill for today's Web-based life? Absolutely. Is it the marquee product needed to give the Chromebook category a futuristic gleam? Absolutely. And if I really were going into exile, the Pixel is what I'd take with me. —Melissa Riofrio



Living with just the Pixel.

HP Envy Phoenix: Gaming Power in a Subtle Form

BY GAMING STANDARDS, the HP Envy Phoenix h9-1420t's appearance is positively subdued. This midsize tower PC has some red back-lighting and a clear pane so that you can gaze at the liquid cooling unit, but aside from that it could easily pass for a conventional HP desktop. Although it doesn't have much in the way of bling, the Envy Phoenix h9-1420t delivers better-than-average performance at a cheaper-than-boutique price. Down-the-road upgrade

options, however, are limited by the system's decidedly nonenthusiast motherboard.

Performance

Our \$1840 test configuration sported an unlocked 3.5GHz Intel Core i7-3770K processor. Thanks to the liquid cooling unit, the system had no problem maintaining 4GHz. The Pegatron 2AD5 motherboard offers minimal overclocking controls in its BIOS, but it isn't entirely locked down. You can set each core's maximum frequency multiplier separately, but you get no provisions for tweaking the operating voltage.

The motherboard also has just a single full-size PCIe slot, so you can forget any dual-card graphics upgrade via SLI or CrossFire.

Fortunately, HP picked a strong graphics card, inserting an Nvidia GeForce GTX 680 that has 2GB of GDDR5 memory. With that card, the Phoenix managed a playable frame rate in *Dirt Showdown* right up to the 2560 by 1600 resolution of our 30-inch test display. The game wasn't as silky smooth at that resolution as it was at lower ones, but it was certainly playable.

The other core components in our test model included 12GB of DDR3-1600 memory and a 2TB, 7200-rpm hard drive, which helped the h9-1420t produce a very good WorldBench 8 score of 87. A solid-state drive would have boosted the score even more, but that option wasn't available when we ordered our unit. HP has since corrected that omission, but there's no getting around that single multilane PCIe slot.

Power and Ports

While you can't add a second video card, the system has lots of room for other components, including one open 5.25-inch drive bay and two free 3.5-inch drive bays, all of which are accessible from the front panel. The graphics card and the liquid cooling unit dominate the area over the motherboard, leaving only two x1 PCIe slots exposed.

Even though the h9-1420t

doesn't have a lot of free slots, it does boast a ton of exterior ports. Down the front panel, you'll find four USB 2.0 ports, as well as the usual array of memory card slots. You also get two DVI ports, an HDMI port, and a DisplayPort connection on the back of the GTX 680, plus two capped DVI ports off the motherboard that are supported by the integrated Intel HD 4000 graphics (should you ever ditch the discrete GPU).

HP bundles a keyboard and mouse with the Phoenix. Both input devices are relatively lightweight with a serviceable feel, but no one would ever mistake them for gaming- or even business-grade models.

Bottom Line

Our test unit costs \$1840, but you can get into the h9-1420t for as little as \$1150 with a slower GPU and a locked CPU. You can also configure the machine with 32GB of memory and a 4TB RAID 5 setup, and hit your bank account to the tune of \$2740.

If you're not dead set on your gaming PC looking as if it had just escaped from a sci-fi film, and if you're sure you'll never want to upgrade to a dual-video-card setup, this PC will give you excellent overall performance and good gameplay. But we're still wondering why the hardware options stop just shy of state-of-the-art. —Jon L. Jacobi

★★★★☆; \$1840; HP; go.pcworld.com/envyphoenix



HP's Envy offers great gameplay.

Digital Storm x17: A More Portable Gaming Option

AT JUST 8.8 pounds sans accessories, Digital Storm's x17 is one of the lightest gaming laptops we've seen.

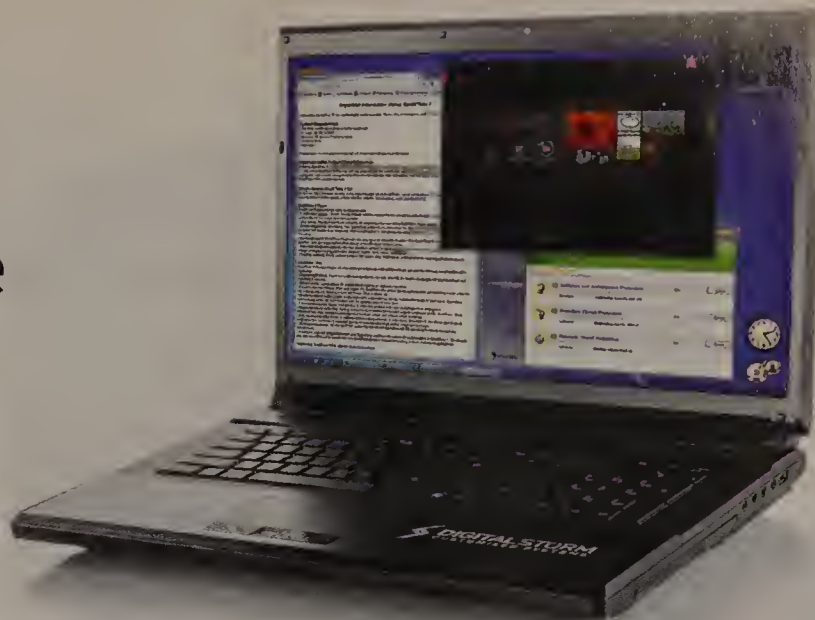
Our review model packs a third-generation Intel Core i7-3610QM processor, 16GB of RAM, and an AMD Radeon HD7970M graphics card. It also runs the 64-bit version of Windows 7 Home Premium.

In our WorldBench 7 tests, it scored 99 out of 100. While that is an acceptable score for a desktop replacement, it's a bit low for a gaming-oriented desktop replacement. The x17 managed 15.6 frames per second in our Web Perfor-

mance tests, but it scored only 2006 in the PCMark 7 Office Productivity tests.

Luckily, it offers gaming-laptop-level graphics. In our Crysis 2 graphics tests, it produced frame rates of between 44.4 (maximum-quality graphics, 1920-by-1080-pixel resolution) and 94.4 (low-quality graphics, 800-by-600-pixel resolution) frames per second. We also eked out 3 hours, 54 minutes of battery life, which is about average for the category.

The x17 comes housed in a solid black chassis with robust hinges, a thick base, and a



The x17 is low on the ounces.

sturdy, unshakable lid. It sports a 17.3-inch glossy LED-backlit display with a native resolution of 1920 by 1080 pixels. For the most part, its screen looks excellent, rendering text and pictures clearly with well-saturated colors. We did notice a shimmering effect while watching videos with darker scenes. But apart from that, the

screen looks very good, with excellent contrast. The x17 also delivers very good audio.

Digital Storm's x17 is a good gaming machine that's lighter than most desktop replacements. But along with the fewer ounces, it also delivers less performance.

—Sarah Jacobsson Purewal
★★★★☆; \$1777; Digital Storm; go.pcworld.com/x17

Origin EON17-SLX: A Semiportable Desktop

THE EON17-SLX IS Origin's latest extreme gaming laptop.

It sports a third-generation Intel Core i7-3940XM Extreme Edition processor, 16GB of RAM, and an Nvidia GeForce GTX 680M discrete graphics card. The laptop runs the 64-bit version of Windows 8, but it lacks a touchscreen.

With a 17.3-inch display and weighing 9.2 pounds (without accessories), the EON17-SLX is a hulk of a laptop. But its size translates to power. In our WorldBench 8 tests, it earned an impressive score of 115, which means it's 15 percent faster than our testing model. It's also the fastest laptop we have tested. Needless to say, it whizzed through most of

our performance tests. The EON17-SLX also scored 5324 in the PCMark 7 productivity test, finishing light-years ahead of the HP EliteBook 9470m (3903) and the Vizio CT15-A4 (3890). Graphics performance is excellent, too: In our Dirt Showdown test, it generated 139.5 frames per second (1366-by-768-pixel resolution, maximum quality settings). But

Origin's gaming laptop is a powerhouse.

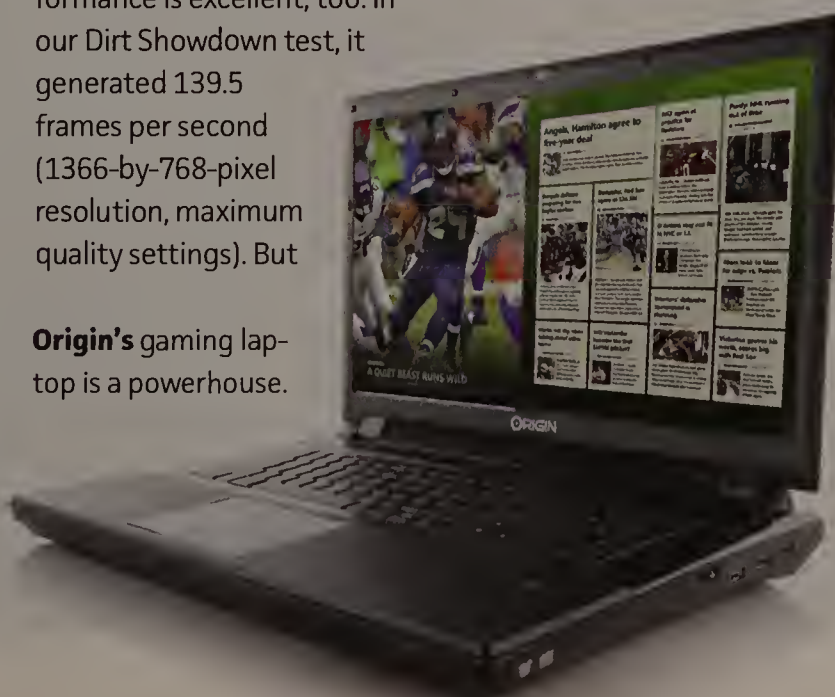
the battery life is pretty bad, as it barely lasted 2 hours, 28 minutes in our tests.

The laptop's cover is made of a soft, rubbery material. Inside, the glossy screen is surrounded by a black bezel. Its

keyboard is large and the touchpad has a slick, textured feel. The display has a native resolution of 1920 by 1080 pixels and looks fantastic. Video looks very good, but audio is a little disappointing.

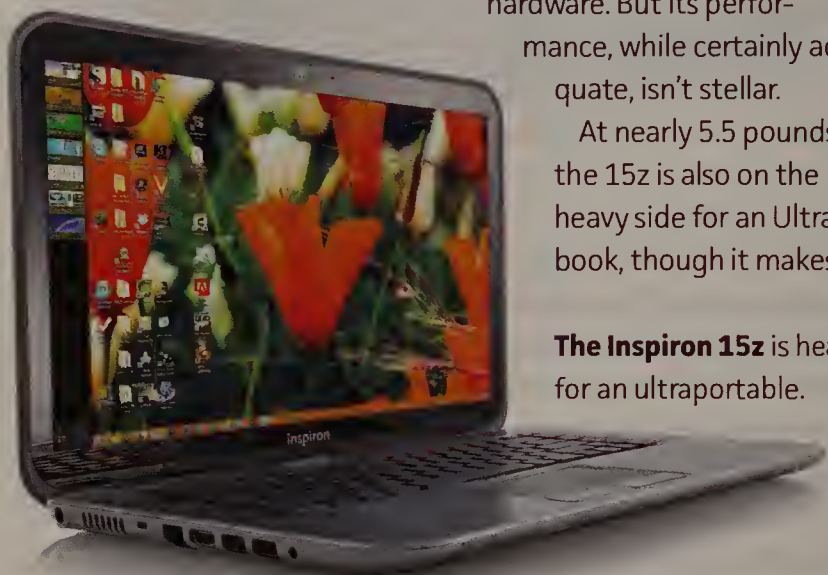
The EON17-SLX is a powerhouse, but it's heavy, has poor battery life, and will definitely benefit from several external peripherals such as a mouse, an optical drive, and possibly a speaker system. I hesitate to call it a laptop. Instead, it's like a semiportable desktop. But then again, you can get a much-higher-performance desktop at the same price.

—Sarah Jacobsson Purewal
★★★★☆; \$3785; Origin; go.pcworld.com/originslx



Dell 15z: Nice Touchscreen, Not Much Performance

THE DELL INSPIRON 15z joins a growing group of Windows 8 laptops that offer a touchscreen display option.



It's a nice-looking package that boasts a built-in 8X DVD±RW drive and above-average audio and webcam hardware. But its performance, while certainly adequate, isn't stellar.

At nearly 5.5 pounds, the 15z is also on the heavy side for an Ultrabook, though it makes a

The Inspiron 15z is heavy for an ultraportable.

fine first impression with a brushed-aluminum finish. The 15.6-inch, 1366-by-768-pixel screen is also very bright, but not as crisp. Its audio, however, is quite robust for a laptop.

The Inspiron 15z didn't quite shine on our performance tests—nor did we expect it to, given its configuration. Dell recently updated the 15z lineup with newer Intel CPUs, and the PC is now outfitted with an Intel Core i5-3337U with a clock speed that's slightly faster (1.8GHz versus 1.7GHz) than the CPU installed in the machine we

reviewed. The 15z's scores on all our tests, from video and audio encoding to browser scripting and file compression, were low compared to the competition. Its power consumption was also on the high side, and it had less than 3.5 hours of battery life.

The 15z might appeal to those interested in using Windows 8 with a touchscreen at locations with power outlets, but it's too heavy, and its battery life is too skimpy for on-the-go use.—Yardena Arar

★★★★☆; \$800; Dell; go.pcworld.com/dell15z

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iTVmediaPlayer™

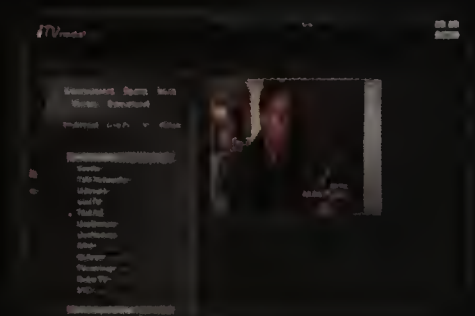
With today's technology, there is no need to pay for expensive TV service. In fact, there is a free, web-based TV service that is revolutionizing the way people watch TV: iTVmediaPlayer. It allows you to watch over 200,000 live TV channels, free HD movies and on-demand shows, legally. You can even connect it to your regular TV or use it on other devices, including computers, mobile phones, gaming consoles and tablets.

Unlike Cable or Satellite TV, what people seem to love the most about this free service is the enormous premium content variety and portability it offers. It is great for on the go, long travels, and the home, since it works anywhere in the world.

In addition to live TV, you also get optional access to on-demand content from well-known, web-based providers — including Hulu®, Netflix®, Blockbuster®, YouTube® — all in a single platform.

The service uses your Internet connection — instead of an "antenna" or "satellite dish" — to connect you to the hundreds of thousands of live and on-demand programs. The service is absolutely free. All you really need is the software/app (which runs on all the aforesaid devices).

For more info, a channel list, or to obtain your own copy (for only \$24.99; one-time purchase), visit iTVmediaPlayer.com



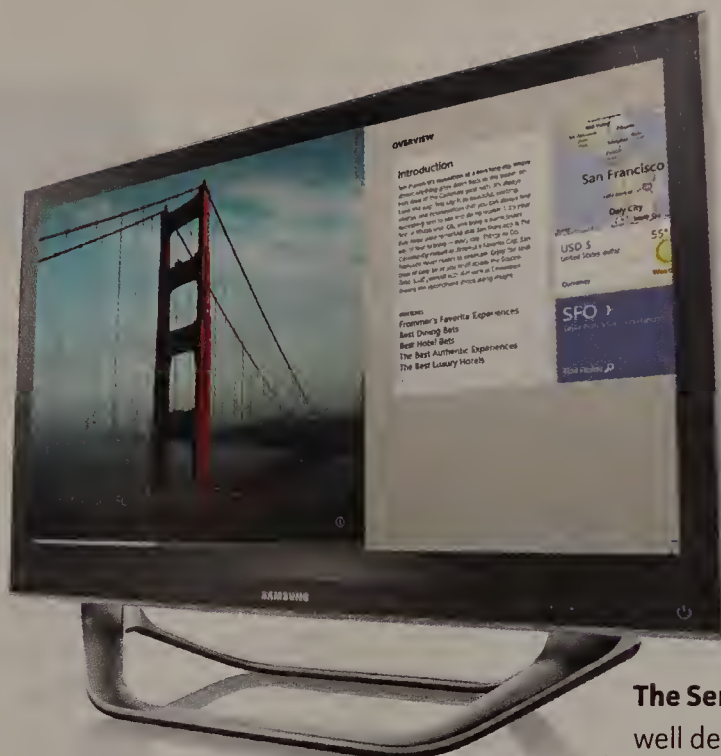
Samsung Series 7: Looks Good, Performs Fine

THE 23.6-INCH DISPLAY of Samsung's Series 7 all-in-one system looks great and delivers both smooth performance and wonderful movie viewing. Gameplay is low resolution, however, and you pay a lot for the form factor.

One of the first things that jump out is that the power button is on the front; most all-in-one systems force you to hunt for it. The bezel surrounding the display and most of the PC is black, while the attractively styled base

and edge trim are silver. The wireless keyboard and mouse are also styled to match.

Our test unit, Samsung's model DP700A3D-A01US, featured an Intel Core i5-3470T, 6GB of DDR3-1600 memory, and a 5400-rpm, 2.5-inch, 1TB Seagate hard drive. The combination registered a score of 62 on our WorldBench 8 test suite. That's decent, but nothing great. The subjective feel for most tasks was smooth and responsive. The integrated Intel HD 2500 graphics

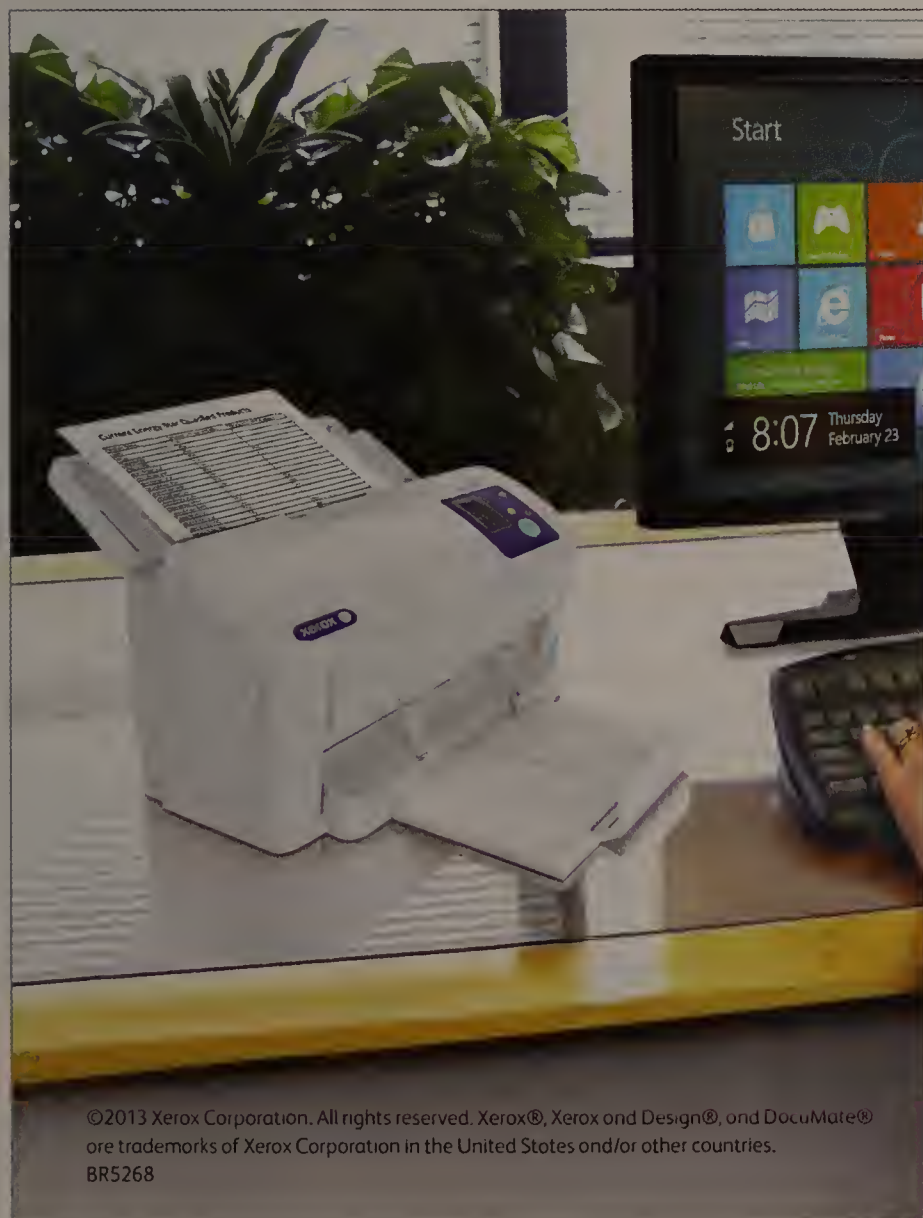


The Series 7 is well designed.

core, however, is hopeless for playing anything other than the most casual games.

This is a solid, good-looking all-in-one system for everyday computing chores. But it would be nice to see options

such as an SSD, discrete GPU, TV tuner, and Blu-ray drive to pump up the Series 7's performance and entertainment package. —Jon L. Jacobi
★★★★☆; \$1000; Samsung; go.pcworld.com/series7



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Sonos Playbar Is a Great Soundbar for the Price

THE PLAYBAR IS the latest entry in Sonos's lineup of streaming audio products. Some other soundbars are far superior single-cabinet home theater systems, but they also cost several times more.

The Playbar is very simple to set up: All you have to do is connect an optical TosLink cable to your TV and plug the Playbar's power cable into a receptacle. If you want to stream music from a computer, server, or NAS box on your network, or from an Internet service like Pandora, either plug an ethernet cable into the Playbar or add a Sonos

Bridge to your wireless network and operate the speaker as a wireless component.

The 35.43-inch-wide soundbar can lie flat at the base of your TV, or it can sit mounted below or above your TV if you have mounted the flat-panel to the wall. A sensor in the cabinet detects the speaker's orientation and triggers an onboard digital signal processor to automatically reconfigure the speaker's equalizer settings to compensate.

You can use your tablet or smartphone to configure the soundbar and play music. You can also use your TV's remote

to control its volume.

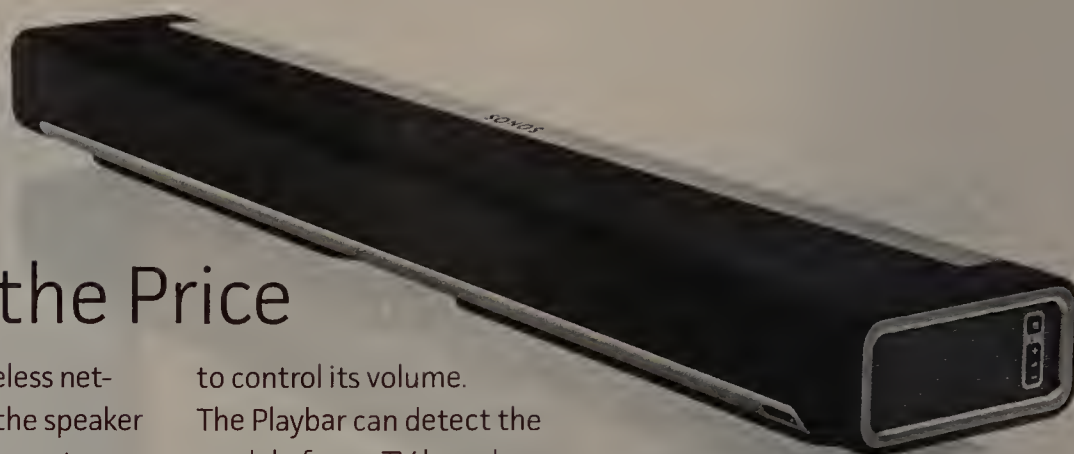
The Playbar can detect the model of your TV based on the signal from the remote, retrieving the information it needs from Sonos's online database. If your TV is not in the database, the Playbar will learn from the remote and update the database for future customers. An infrared receiver on the front of the cabinet can also pass the remote's commands through to an IR repeater on the back of the cabinet, which in turn sends those commands to your TV.

Nine speakers—six mid-ranges and three tweeters—

The Playbar has good sound.

driven by nine discrete Class D amplifiers form a phased array that renders the Playbar more directional than would otherwise be possible from such small drivers. Tweeters mounted on the Playbar's left and right ends also give it a very large soundstage that's effective and enjoyable with both music and movie soundtracks. —*Michael Brown*

★★★★☆; \$699; Sonos; go.pcworld.com/playbar



B&W's A7 Speaker Delivers Outstanding Audio

BOWERS & WILKINS'S A7 AirPlay speaker doesn't disappoint: It sounds incredible.

The A7 also cuts an imposing figure. It's a handsome speaker with a wrap-around, black-cloth grille, brushed-chrome accents, and a thin aluminum band that surrounds the unit.

You can stream music to the A7 via Wi-Fi or wired ethernet; alternatively, you can listen to USB audio from your Mac or Windows PC.

You can connect the A7 to your wireless network by using B&W's iOS app, using the appropriate app for your Mac or Windows PC, or connecting your computer to the speaker via ethernet and visiting the A7's IP address in your browser of choice.

The real fun, however, begins once you start listening to the A7. The speaker uses a pair of 1-inch, Nautilus-tube aluminum tweeters; two 3-inch midrange drivers; and a 6-inch Kevlar-reinforced subwoofer. The subwoofer employs a 50W amplifier, while the other drivers each get 25W amplifiers.

The result of all that power? Incredible, deep, full, and

wide sound. We often talk about speakers as having room-filling sound. The A7 certainly offers that. But there's more: While plunking yourself down in a plum position directly in front of the speaker certainly affords you a premium listening experience, the A7 also offers great sound from a surprising distance, and even off-center.

And there's more to the A7's audio than oomph and soundstage. Its sound is crystal clear, the bass is powerful, and the overwhelming sense is that you're hearing the music the way it was meant to be heard. —*Lex Friedman*

★★★★★; \$800; Bowers & Wilkins; go.pcworld.com/a7



B&W's A7

looks attractive and sounds terrific.

Belkin Advance N900: Feature-Light for the Price

MOST CONSUMER ROUTER manufacturers make their products easy to install, but Belkin goes the extra mile, shipping the N900 (\$180) with its ethernet cable and power adapter plugged in. My unit arrived with WPA2 Personal security enabled on both networks, and with the SSID and password printed on a card. It also supports WPS.

The N900 hides its antennas inside the enclosure. It has a WAN port, a four-port gigabit switch, and two USB ports (for network-attached storage and a printer).

Belkin describes the N900 as “the most powerful router we have ever created,” and the



Belkin's N900 Wi-Fi router produces good speeds.

unit's test results largely back up that claim. In a roundup of five routers, the N900 posted

a strong second-place finish at each test location on its 2.4GHz network, and it outperformed four other models tested—by a wide margin—on its 5GHz network at close range, when it was separated from the client by 9 feet.

I wasn't nearly as impressed with the N900's performance copying files across the network to a hard drive attached to its USB port. It delivered a middling result while reading files—be it a single large file or a large collection of small files and folders—but it was excruciatingly slow at writing those files back to the drive.

The N900 boasts only a few features. Belkin touts a Video

Mover server for streaming media, but no iTunes server is on offer, and Belkin doesn't indicate whether the router is DLNA certified. The unit also lacks FTP and VPN server functions. Quality of Service settings are limited to a feature called Intellistream, in which the router analyzes traffic and assigns higher priority to data packets that are sensitive to lag, such as VoIP or gaming traffic.

The N900 is a strong wireless performer, but it's hard to recommend at its current price since it has such limited features. —*Michael Brown*

★★★★☆; \$180; Belkin; go.pcworld.com/belkinn900

WD My Net N900 Central: Wi-Fi Plus Storage

WESTERN DIGITAL'S \$200 My Net N900 Central is basically WD's My Net N900 Wi-Fi router (go.pcworld.com/wdn900) with a 2.5-inch hard drive (I tried the 1TB model; a 2TB version is available).

I assumed that the presence of this drive would help the Central outperform the other four routers in my test group on file reads and writes, but I was mistaken: This router, which communicates with the drive over a SATA-to-USB bridge, was slower than the standard My Net N900 on three of my four tests. The Central did manage to take second place when writing a single large file to its hard drive, though.

In addition to the physical security of housing a hard drive, the Central offers two other benefits: You get Western Digital's Smart Ware software for backing up your PCs to the router's storage, and you can access the hard drive via the WD2Go cloud service.

In wireless-performance tests, however, the Central's 2.4GHz network was slightly slower than that of the standard My Net N900, while its 5GHz network was slightly faster. More disappointingly, the Central couldn't maintain a connection to my PC when the computer was in my home theater, 35 feet away.

The Central is every bit as easy to set up as its driveless

cousin, and it comes with the same three Western Digital utilities: Print Share, Quick View, and My Net View. It also offers FasTrack Plus Quality of Service, which prioritizes audio and video streams over more lag-sensitive traffic; in addition, you can write

up to 32 custom QoS rules.

In the end, having a router with a cloud-accessible internal drive is certainly convenient, but I wouldn't call this model fast. —*Michael Brown*

★★★★☆; \$200; Western Digital; go.pcworld.com/mynetcentral



The N900 Central hides a hard drive.

Pebble Smartwatch Falls Just Short of Greatness



The Pebble watch comes with three attractive faces.

THE PEBBLE SMARTWATCH, which has journeyed from Kickstarter project to reality, is a Bluetooth peripheral for iPhone or Android handsets.

It works as a watch too, of course. The best of the three included faces, Text Watch, has an attractive typeface that displays smoothly on the 144-by-168 low-power LCD screen. The watch is readable in normal light; in the dark you can activate a backlight.

After I paired the Pebble with my iPhone 5, it connected to the Phone, Music, and Messages apps. When a call

came in, the Pebble vibrated and showed the caller's identity. When someone sent me a text, the message appeared on the screen. In the Pebble's Music app I could see the current track, as well as play, pause, and change tracks.

Support for other notifications is spotty due to an incompatibility between the Pebble and iOS 6. I had to go to my iPhone's settings and toggle the notifications for particular apps on and off.

The watch also has a low-power Bluetooth 4.0 radio, a magnetometer, and an ambi-

ent light sensor, but they aren't supported right now. Pebble CEO Eric Migicovsky says the company will issue software updates until all of the features promised on the Kickstarter page are available.

This cool, geeky watch could be a lot more than it is now if the company can make good on that promise. The hardware is solid enough that I'm optimistic, but at present I'd encourage only the most adventurous to jump on board. —Jason Snell

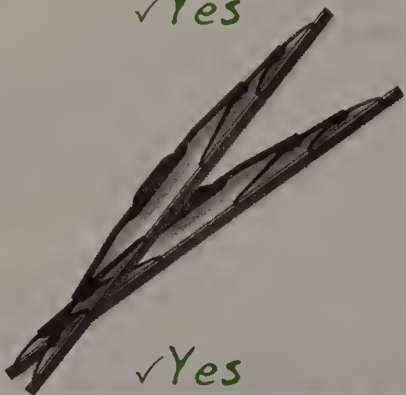
★★★★☆; \$150; Pebble; go.pcworld.com/pebbleev



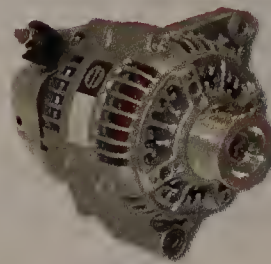
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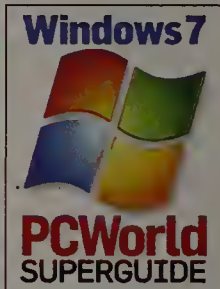
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Dell's C1660w Is a Good Light-Duty Printer



You'll get sharp text and great graphics from the C1660w.

THE \$200 DELL C1660w makes color-laser-class printing (using LED technology) tantalizingly accessible. But since the toner is expensive, the C1660w is a good deal only if you don't print much.

The front panel flips out to make the bottom of the 150-sheet input tray. The output bin on the top holds 100 sheets. Duplexing is manual.

You get 500-page starter cartridges with the unit. The 4.0 cents you'll pay per black page is a bit higher than the

average for entry-level inkjets. Adding color to the average page costs a steep 16.8 cents. Black toner comes in \$50, 1250-page units; the 1000-page cyan, magenta, and yellow cartridges cost \$56 each.

The C1660w's output quality matches that of laser-class printers costing far more. Text is sharp, and black areas are smooth and uniform, though a tad lighter than we'd like. Color graphics and photos look outstanding.

The speed is fine for light

use. In tests, black-text pages and mixed pages of black text and monochrome graphics printed at an aggregate 7.2 pages per minute on the PC and 7.5 ppm on the Mac. Full-page (letter-size) photos printed to laser glossy paper at a swift 1.5 ppm. Snapshot-size (4-by-6-inch) photos

printed at 2.7 ppm to plain paper and just under 2.1 ppm to glossy laser stock.

With pricey toner and light-duty capabilities, the Dell C1660w is best for small or home offices. —Jon L. Jacobi and Melissa Riofrio

★★★★☆; \$200; Dell; go.pcworld.com/dellc1660w

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Postbox: A Slick and Affordable Email Client

DOWNLOAD



IF YOU WANT a desktop email client that isn't Outlook, one appealing option is Postbox, a modern-looking client that plays nice with Gmail and will set you back just \$10 after the 30-day free trial.

Postbox 3.0.7 is based on Mozilla Thunderbird, but most of the interface looks different. A vertical split puts message headers on the left and the body on the right. (You can switch to the horizontal Classic View.) By default, the leftmost part of the window has a nested list of folders based on your Gmail labels. All of my labels synced, except for the Bulk label, into which I filter incoming "gray mail." I fixed the problem by making Bulk available via IMAP (as all of my other labels were set).

Postbox adds desktop-interface niceties to threaded conversations, such as allowing you to pop open a conversation and access a message from the headers list. Some visual differences are disorienting, however. For example, the message list shows senders' names in bold, even for email that you have read.

The Focus Pane lets you slice and dice the current folder and

James Bruce, Erez Zukerman, Saikat Basu	12:38
Public service announcement: Stop using em-dashes or whatever they're called in TIT...	8D
Tina Sieber, Yaara Lancet, Ryan Dube, Aibek Esengulov [MakeUseOf.com]	12:20
Gamification Meeting	6D
Aibek Esengulov [MakeUseOf.com]	12:20
Tina Sieber	10:55
Aibek Esengulov [MakeUseOf.com]	10:02
Tina Sieber	Yesterday

Postbox fully supports Gmail-style threaded conversations.

find messages. Plus, Postbox lets you assign "topics"—another layer of classification, distinct from labels—to your email.

Overall the interface feels busy, but you can eliminate the folder pane by setting up favorite folders accessible via a toolbar. You can also collapse and expand the Focus Pane, and hide the email preview pane. If you're not happy with Gmail's browser interface, you would do well to try Postbox. Just be sure to allow for an adjustment period. —Erez Zukerman

★★★★ ; \$10; Postbox; go.pcworld.com/postbox

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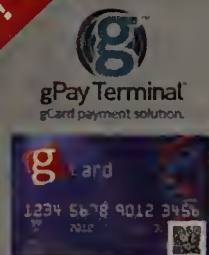
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Decor8 Customizes the Windows 8 Start Screen

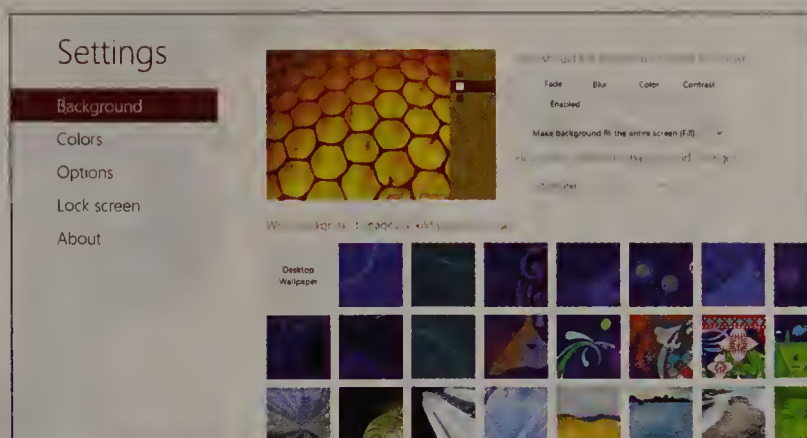
DOWNLOAD



MICROSOFT OFFERS A few preset backgrounds for Windows 8's Start screen and lock screen (which you see before Start). For no-holds-barred personalization, however, turn to Stardock's \$5 utility Decor8.

The Background section lets you set what appears behind the tiles in your Start screen. Decor8's list includes simple vector affairs as well as bold nature and macro photos that stand in stark contrast to the flat Windows 8 aesthetic and lend the Start screen some dramatic flair. If you prefer, you can use any image on your computer as your Start screen background. You can also rotate through several images each day or set the Start background to be the same as your desktop wallpaper. You can also fade or blur the image, and adjust tint and contrast.

In the Colors section, you can adjust the tile color scheme, using one of Windows' standard schemes, making your own, or having Decor8 create one according to the background image.



Choose from Decor8's images, or use one from your own albums.

The Options screen's only truly interesting item allows you to change the number of tile rows on the Start screen—you can even create a one-row Start screen, although I'm not sure how useful that would be. Last, the 'Lock screen' section allows you to configure a background for your lock screen. Unlike the Start screen, though, the lock screen doesn't permit you to apply tint and fade effects to your background.

Joining the growing ranks of applications aiming to fix Windows 8's deficiencies, Decor8 is evolutionary, and it works. The utility offers a painless, inexpensive option. —Erez Zukerman
★★★★☆ ; \$5; Stardock; go.pcworld.com/decor8



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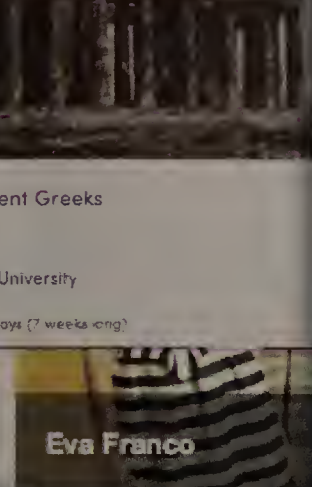
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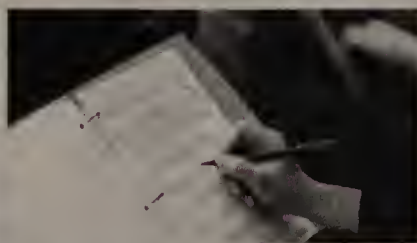


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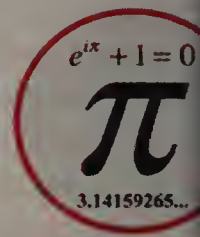
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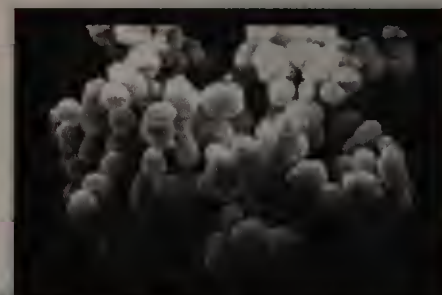
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101

GREATEST WEBSITES

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Think you've been there and done that on the Web? Here are 101 sites worth discovering.

BY PCWORLD STAFF

THE WEB CAN SEEM as infinite as space, and while it's sometimes fun to explore on your own, prepare yourself to encounter plenty of emptiness between the worthwhile discoveries. Wouldn't it be more fun to get straight to the good stuff?

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Entertainment

These are the sites we visit to play games, listen to music, watch videos, be inspired, or just burn a few hours.

Addicting Games: This gaming hub offers thousands of free online games, sorted by popularity, category, number of players, and type of device. Sure, not every game will induce withdrawal symptoms if you can't get your fix, but this site has so many to choose from that being cut off from it just might.

AddictingGames.com

Aereo: Online streaming video is everywhere. Live TV streaming? Not so much. Aereo solves this problem—if you live in NYC, that is. Aereo offers live streaming TV from channels such as NBC, Fox, and the CW for a reasonable price. One hour of streaming TV per day is free, and 24/7 access for a year costs just \$80. Aereo plans to add 22 cities this year. Aereo.com

AncientX: If you find ancient mysteries as fascinating as we do, you'll flip over AncientX. It explores the possibility that early mankind was scientifically advanced thanks to interventions from extraterrestrial beings. You'll find quite a few nonsensical conspiracy theories here, too, but it's all in fun. We think. AncientX.com

Atari Arcade: Remember the good ol' days of Asteroids, Pong, and quarter arcades? Atari has ported several of its

classic arcade games to HTML5, so you can play Super Breakout, Centipede, Missile Command, and more to your heart's content in any browser for free. Play while you can—Atari recently filed for bankruptcy protection. Atari.com

Cowbird: Create and discover engaging personal stories on this social network, produced by people from all over the world. Instead of news streams, one-line posts, and pokes, you get text, audio, and still images built around moments and observations from everyday life. You can also follow your favorite storytellers and share interesting stories. Cowbird.com

Devour: Most YouTube videos aren't worth watching. And that's where the curated YouTube site Devour comes in. The Devour team handpicks the best YouTube videos and posts them to the site daily. Surf videos randomly or check out popular clips. We can't wait for our next meal. Devour.com

Digg: You only *think* you know Digg. The site has new owners and a new look. One thing that hasn't changed is the addictiveness of the user-rated news site's front page. You'll encounter interesting stories like "The 8 Incredibly Gross Powers Superman Doesn't Even Realize He Has." We dig it. Digg.com

Find Your Way to Oz: If you want to see the latest in interactive Web technolo-

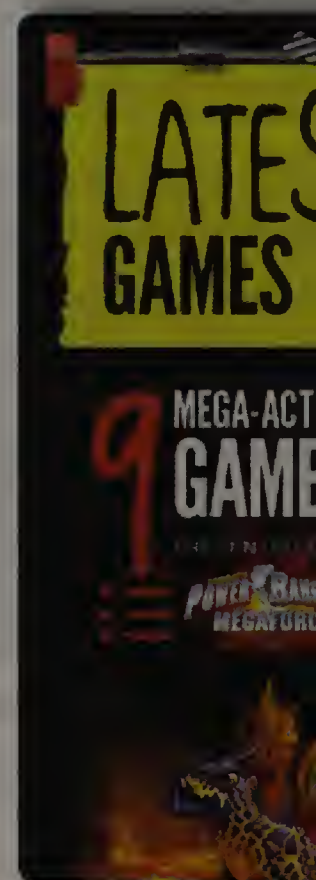
gies, wander through this experiment from Google and Disney. A promotional vehicle for the film *Oz the Great and Powerful*, the site lets you explore early scenes from the film, take your picture at the circus photo booth, check out areas near the big tent, or fly through a tornado in a hot air balloon. FindYourWaytoOz.com

FutureMe: Future Me is an easy-to-use site that lets you write an email to yourself that will arrive in the future. Just enter your email address; type a message; pick the month, day, and year that you want the message delivered; and click *Send to the Future*. In the future, when you receive a message from the past, do you think you'll chuckle, laugh, cry, or sigh? Just remember to keep the same email address. FutureMe.org

Ghostly Discovery: This service streams music to fit your mood. Adjust three sliders to indicate your mood (on a scale from sad to aggressive), musical preference, and tempo. This approach makes a nice change from the "if you like that, then you'll like this" method of music discovery. Ghostly.com/discovery

GoComics: Daily updates of Universal Press Syndicate's newspaper comic strips past and current appear here, plus selected web comics. You'll find everything from editorial cartoons to Calvin and Hobbes strips to the work of up-and-coming cartoonists. GoComics.com

Indie Royale: If you're jonesin' for a new game to play but you're near broke, head to Indie Royale for bundles of innovative titles, many for less than \$6—though you're encouraged to pay more if you can. As the demand for a given



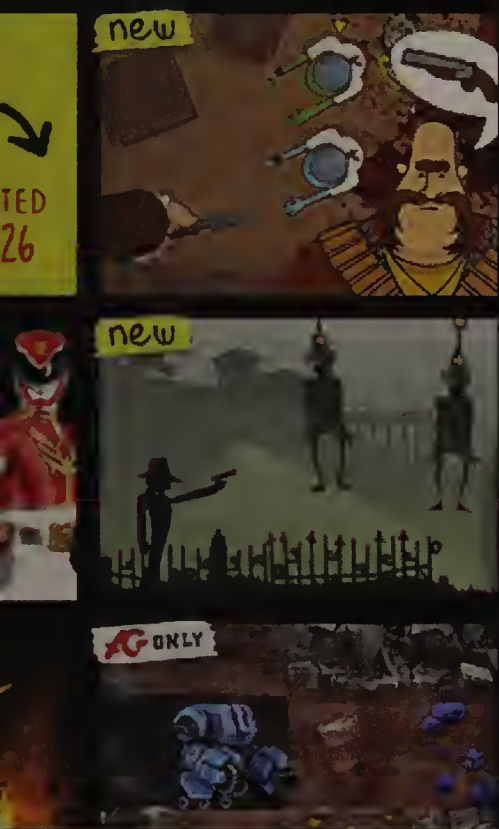


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Devour: Bypass YouTube drek with these hand-picked YouTube videos.

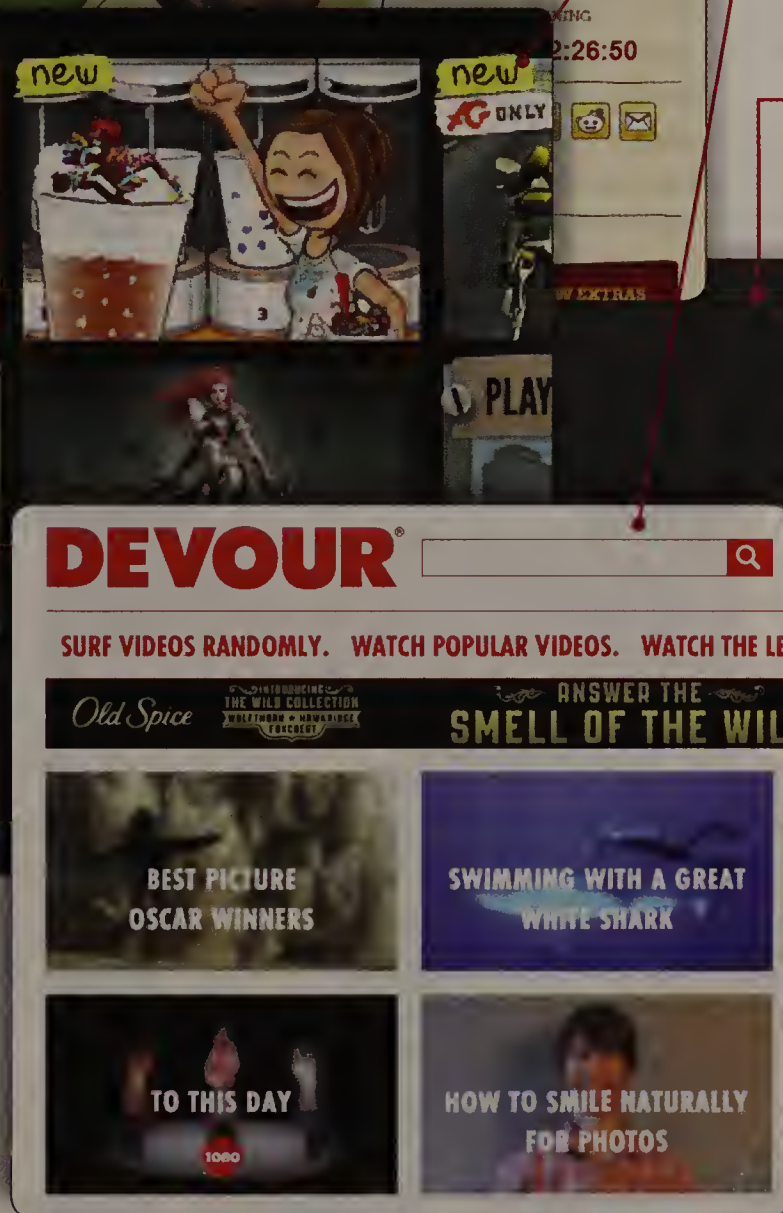
Map of the Dead: This game's promo site helps you fight off zombies.



bundle rises, so does the minimum price, so it pays to jump in early. Buy an All-Charity Bundle, and 90 to 95 percent of your payment will be donated to the named charity.

IndieRoyale.com

Know Your Meme: Ever feel like everyone's in on the joke except you? Know Your Meme informs you of the latest ideas, viral videos, and other phenomena burning up the intertubes. This site is curated by "trained" Internet specialists who report, track, and trace the origin of every known meme. Because on the Internet, no one knows you're a dog. KnowYourMeme.com



Map of the Dead: This promo site for the online game Map of the Dead could help you survive the coming zombie apocalypse. Enter your zip code, and the map zooms to your location. Areas in red indicate higher numbers of humans, which means they'll attract zombies. When your ammo, food, and medical supplies run low, these maps will also pinpoint locations you can raid. MapoftheDead.com

McSweeney's Internet Tendency: This literature and humor site, from American publishing house McSweeney's, overflows with essays, humor articles, satirical lists, and witty observations. Our favorite stories include "Famous Writers' Cosmo Tips," which imagines authors such as Shakespeare and Hemingway writing relationship advice for *Cosmopolitan*; and the breakup letter "It's Not

You, It's Quantitative Cost-Benefit Analysis." McSweeneys.net/tendency

Miniclip: You'll find thousands of games on offer, including a collection of great multiplayer games. Registered users can record high scores, earn achievements, and create custom game avatars. And unlike Facebook's games, Miniclip won't publicize your guilty pleasure to your friends, or pepper them with annoying messages to join in. Miniclip.com

Radio Reddit: Anyone who craves tunes more diverse than those on the typical Top 40 lists should check out Radio Reddit. This music-discovery property features music submitted by independent musicians, artists, and bands, in six streams: Electronic, Hip Hop, Indie and Alternative, Metal, Rock, and Talk, plus Main Stream (which rotates through various genres) and

On Random (which cycles through the most popular tracks, as voted by listeners). RadioReddit.com

Retronaut: Unearth ancient relics at Retronaut, a collaborative storehouse for images, audio, and video from the past. You can find 14th-century songbooks, blooper reels from 1930s Warner Brothers films, and more. Upload your own vintage media, or just sit back and enjoy the crowd-sourced archive of recorded history you've never heard of. Retronaut.com

Songza: This music-streaming site plays music to match your mood. Songza plays a more diverse collection of music than Ghostly Discovery. Click the icon that best represents your mood, whether you're at

work and want lyric-free music or you just want to find new tunes. If you create an account, Songza will create playlists that match your tastes. Songza.com

Thesixtyone: Looking to find the next big undiscovered band before their hit song plays over the credits of *Girls* or *The Walking Dead*? You might find them on Thesixtyone. This site plays an uninterrupted stream of music from independent artists and lets you rate your favorites. The more "likes" a song gets, the more people will hear it in their stream. You can also create playlists, comment, share songs, and, if available, buy and download albums. Thesixtyone.com

Twaggies: Each week, illustrators take interesting or funny tweets and turn them into cartoons. Founded in 2009 by writer, blogger, and journalist David K. Israel, Twaggies is a fun stop to find out just how visual a 140-character message can be. Twaggies.com

Where Cool Things Happen: We could spend hours perusing the photos on this site, such as a hot-tub boat, a chandelier made from 500 Gummy Bears, a frozen waterfall in Minnesota, an eco-lodge in Columbia, and lots of animals (who needs cats when you can see photos of dogs driving cars?). WhereCoolThingsHappen.com

XKCD: Nerds of all stripes will find common ground at XKCD, a self-described Web comic of "romance, sarcasm, math, and language." The art

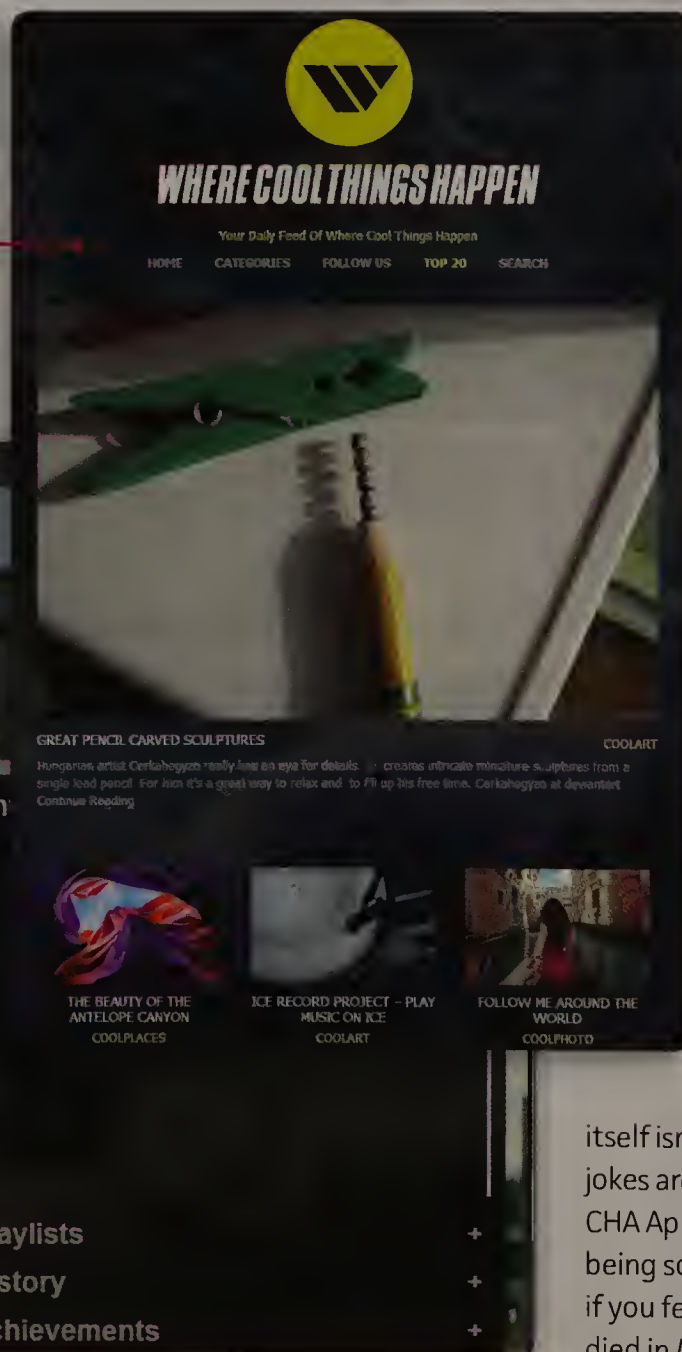
itself isn't much to look at, but the nerd jokes are spot-on, including "A New CAPTCHA Approach," a prove-you're-a-human-being scheme in which a pop-up box asks if you felt sad when Littlefoot's mother died in *Land Before Time*. XKCD.com

Thesixtyone:

Discover great indie artists before they hit it big.

Where Cool Things Happen:

You'll find fascinating, odd-ball images here.



Lifestyle

These are the places we haunt when we're indulging in our hobbies, learning how to do things, shopping, and more.

1stdibs: As an online storefront for brick-and-mortar shops selling antiques and midcentury treasures, 1stdibs offers glorious virtual window shopping. Whether you're looking at a George Nakashima coffee table or a collection of 19th-century American folk art puppets, you won't find a more interesting online source of vintage design. 1stdibs.com

Bookish: To find a great read, we turn to Bookish, a sophisticated recommendation engine from Simon & Schuster, Penguin Group USA, and Hachette Book Group. Enter up to four titles, and Bookish offers another based on genre, subject, characters, awards, and critical reviews. The publishers' editors curate the recommendations. Bookish.com

Bureau of Trade: This site offers intriguing luxury items. Each month a new store sells products based on a theme, from British espionage (think vintage trench coats) to safari gear. The Bureau says the gear is bought from secondhand shops and flea markets around the world, but even if it's from eBay, the site is a fine aggregator of exotic accoutrements. BureauofTrade.com

BuzzFeed: "9 Sexist Things That Happened at the Oscars." "21 Dogs Who Don't Realize How Big They Are." These are the kinds of fascinating factoids that BuzzFeed specializes in. It's definitely not a news site, but it must be visited daily, lest you miss irresistible gems highlighting celebrity missteps, adorable animals, and human absurdities. BuzzFeed.com

Byliner: Byliner is our go-to place for finding great fiction and nonfiction. You can save stories to read later, and recommend them to others. Byliner's "Originals" program publishes ebooks by the likes of Margaret Atwood and Chuck Palahniuk. The service is free, but a \$10-per-month subscription plan—Byliner Premium—delivers additional >>



The 6 Fastest Ways to Surf the Web

FEW AREAS OF the country will have every solution available, but here are the fastest ways to connect your home network to the Internet.

Fiber: Fiber-optic cable to the home, such as that used for Verizon's FiOS network, is the best solution; it's also rare and expensive. Some ISPs bring fiber to the curb and then use copper to connect to the home, while others—such as AT&T's U-Verse—bring fiber to the network node and use copper for the last mile. Fiber to the home can deliver downlink speeds as fast as 300 megabits per second and uplink connections up to 65 mbps. But the further your home is from the end of the fiber, the slower your connection will be. The aforementioned U-Verse service, for instance, because it uses copper for the last mile, tops out at 24 mbps down and 3 mbps up.

Cable: Cable TV service providers can piggyback Internet service on their digital TV offerings. Their coaxial cable delivers much more bandwidth than the unshielded twisted-pair cable the telcos use, but not nearly as much as fiber. Cable service can deliver downlink speeds in excess of 100 mbps and uplink speeds of up to 20 mbps.

DSL: While a consumer digital subscriber line is technically capable of delivering downlink speeds up to 40 mbps, typical residential service plans provide anywhere from 1.5 mbps to 8 mbps, depending on how much you're willing to spend. Uplink speeds are much slower than that.

Satellite: If you can't get Internet service any other way, satellite service is usually a good option (provided that you have a clear view of the southern sky). The DishNet service offers plans delivering speeds as fast as 10 mbps. The downside of this option is high latency, which can cause problems with online games, because outgoing data must travel a very long distance to reach the satellite.

IEEE 802.11e: Services based on the IEEE 802.11e wireless standard, such as Clearwire's consumer wireless Internet service, typically peak at around 6 mbps. The standard is theoretically capable of delivering higher speeds, but 4 to 8 mbps is typical of real-world deployments.

Mobile Broadband: You can use this service anywhere you have cellular service, either by tethering your smartphone to your computer or by using a cellular router. The primary downside is cost, since your smartphone service provider will typically require you to pay for a data plan.

features and content. [Byliner.com](#)

DeviantArt: Anyone with a smartphone can become an Instagram sensation, but DeviantArt is where the real artists hang out. Traditional and modern artists alike can showcase their talents in categories that range from painting and photography to Rainmeter skins and desktop wallpapers. [DeviantArt.com](#)

Fab: This isn't a typical flash-sale site. While Fab does host three-to-five-day flash sales, those sales are not for designer clothing or services in your city. Instead, it sells design items at a discount, including eclectic furniture, quirky accessories, and pop-art prints. It's the perfect place to find unique gifts. [Fab.com](#)

HackerThings: Whether you're after a gag gift for your favorite nerd or a motor for a DIY robotics project, you'll find it at this ultimate geek mall. We spotted bars of caffeine-spiked glycerin soap (\$25), a 3.6-volt micro hydro generator (\$29), and a mini turbojet engine (\$2400). If you can dream it up, you'll find the parts to build it here. [HackerThings.com](#)

HacknMod: If you've never encountered a product you didn't think could be improved with some modifications, check out HacknMod. It's brimming with cool DIY projects such as modifying game consoles (install one in your car) and laser pointers (convert a laser into a long-range listening device). [HacknMod.com](#)

Honeyfund: Not all newlyweds want silver and china as gifts. Some would prefer a lavish honeymoon. Enter Honeyfund, a honeymoon registry. Couples sign up with the free service to receive monetary gifts that help fund their honeymoon. The site even has a calculator for estimating how much a dream getaway will cost. [Honeyfund.com](#)

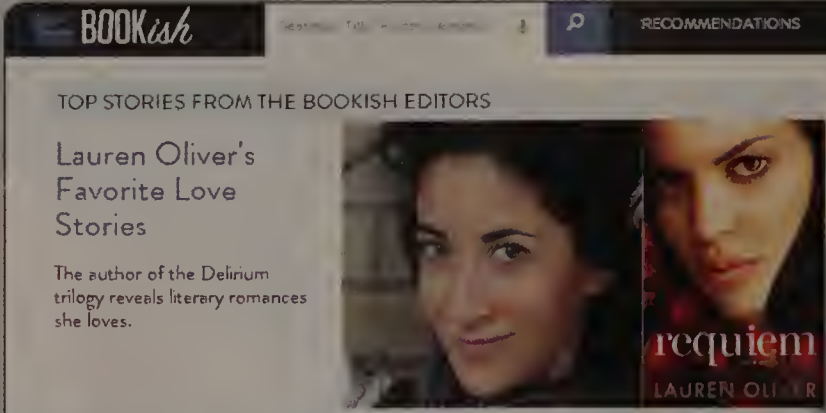
Houzz: Whether you're decorating a dorm room or building your dream home, Houzz is a font of inspiration. You'll find a trove of professional photos of interiors and exteriors grouped by style (modern, traditional, and eclectic). You can also create idea books filled with photos and

BOOKISH

TOP STORIES FROM THE BOOKISH EDITORS

Lauren Oliver's Favorite Love Stories

The author of the Delirium trilogy reveals literary romances she loves.



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Make your own Electronic Post-It Notes

Make Your Own - Guitar Hero Controller

Superb Mechanical Seven-Segment Display

Build Your Own TRON-Themed Segway

DIY Google Street View System

Now you can have your very own copy of Google's revolutionary camera system! Use it to make your own street view videos from a car or you can even mount it on a backpack and take it hiking with...

Just Eat Real Food

This Facebook page has amassed more than 110,000 likes by showing what can be done with fruit, vegetables, meat, fish, nuts, and seeds. It focuses largely on the "paleo" diet (no bread, legumes, refined sugar, or vegetable oils), but even loaf lovers will crave the nicely photographed chow in this feed. [Facebook.com/Justeatingrealfood](#)

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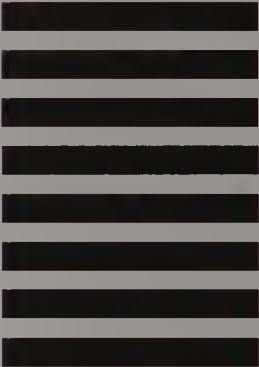
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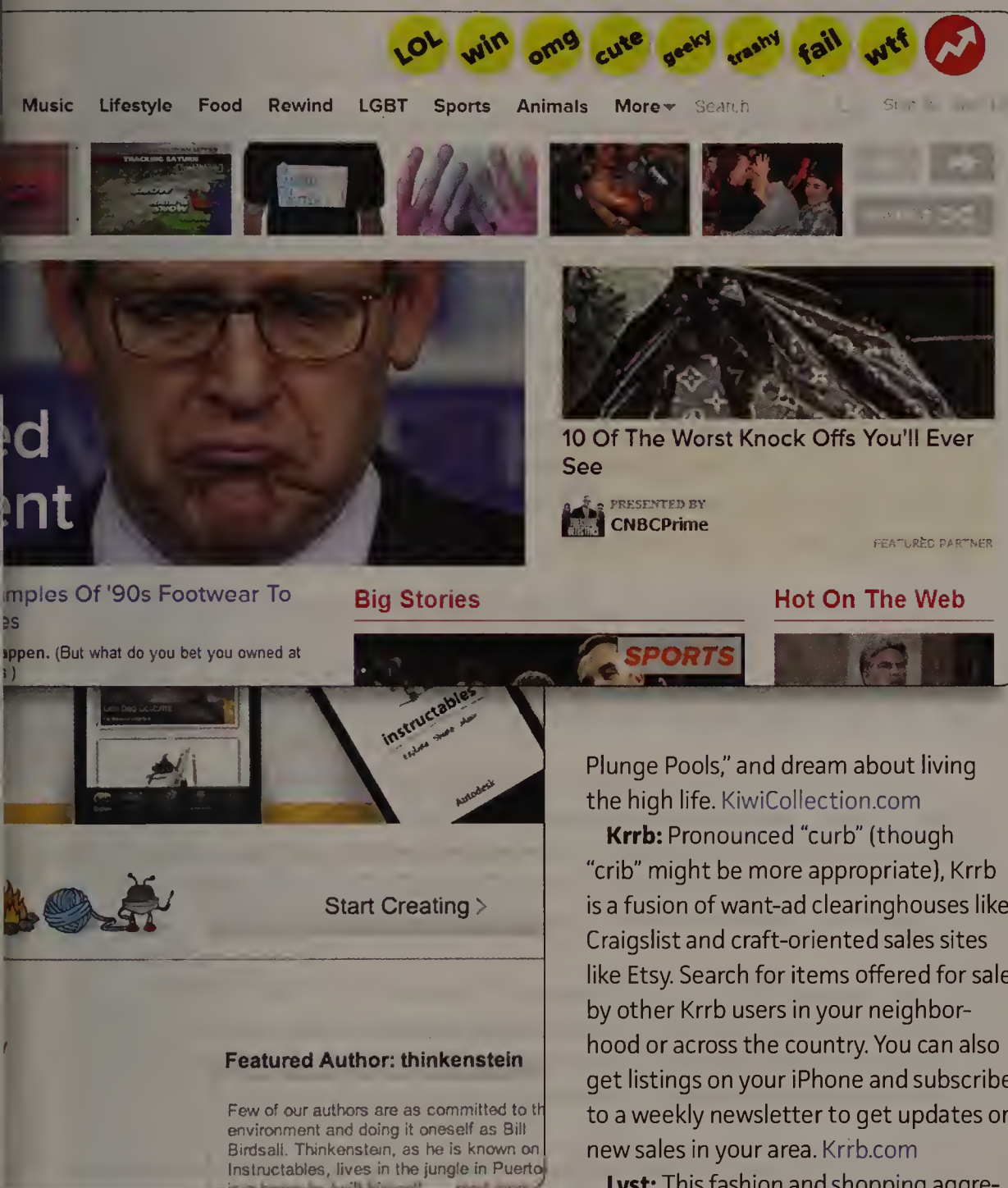
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—such as the AMA from a Columbine survivor—that really illustrate the power of social sharing. Reddit.com/r/ama

Reddit's Cordcutters: This subsection of Reddit is dedicated to the topic of dumping pay-TV subscriptions. You'll learn where to find high-quality, legally obtained programming; the right equipment for tuning into free (ad-supported) TV broadcasts so you can see local news, sporting events, and other shows; and more from fellow cordcutters. Reddit.com/r/cordcutters

Schemer: *Carpe diem* is the name of the game with Google's new social site for finding interesting things to do with your spare time or to put on your bucket list. Schemes run the gamut from completing a marathon to rocketing into orbit. Schemer integrates with Google+ and displays schemes from people in your network. Schemer.com

Popsugar Shopping: This shopping site aggregates clothing and accessories from well-known vendors such as Nordstrom, Bloomingdale's, and Saks. You can fine-tune your browsing with an array of parameters including color, outfit style, price range, and even just items that sell for at least 70 percent off. ShopStyle.com

Shorpy: Culling images from reader submissions and public archives like the Library of Congress, Shorpy shows us just how many fascinating stories are told in vintage photography. The black-and-white images will make you yearn for the next season of *Boardwalk Empire*, while the reader-submitted color images call to mind *Mad Men*. Shorpy.com

Very Short List: Email newsletters are back in style, and the Very Short List is a prime example. There's a different topic for each day—tech on Mondays, food on Fridays, and so on—and you can pick only the days you're interested in. We recommend choosing them all, because every VSL newsletter is concise, interesting, and packed with images, charts, and infographics. VeryShortList.com

WonderHowTo: A good how-to site >>

Kayak: You're probably familiar with Kayak as a travel aggregation site, but you needn't have a destination in mind to use this service. Use Kayak's Explore feature, and you can choose your port of departure and search for flights to, well, just about anywhere. Then just get ready for an adventure! Kayak.com/explore

Kiwi Collection: Want to see how the other half vacations? The Kiwi Collection showcases luxury hotels from around the world—from six-star desert oases to private Caribbean islands for rent. Search by location and availability, or just browse through the Kiwi Collection's photosets, such as "Rooftop Hotspots" and "Private

Plunge Pools," and dream about living the high life. KiwiCollection.com

Krrb: Pronounced "curb" (though "crib" might be more appropriate), Krrb is a fusion of want-ad clearinghouses like Craigslist and craft-oriented sales sites like Etsy. Search for items offered for sale by other Krrb users in your neighborhood or across the country. You can also get listings on your iPhone and subscribe to a weekly newsletter to get updates on new sales in your area. Krrb.com

Lyst: This fashion and shopping aggregation site boasts the tagline "Discover a store made just for you." List your favorite brands, and Lyst provides a "stylefeed" that's tailored to your taste. The site displays clothing, shoes, and accessories in a cool Pinterest-like feed. Lyst.com

Reddit Ask Me Anything: Some of the most compelling content on Reddit, a popular crowd-sourced news and meme factory, is in its "Ask Me Anything" section. Whether you're a Panda Express line cook itching to divulge kitchen secrets or NASCAR legend Jimmie Johnson, you can jump onto Reddit and solicit interview questions. President Obama, Louis C.K., and Jimmy Kimmel have all conducted "AMAs," but it's the under-the-radar contributions

is a rarity. Consider these lame stories from the homepage of one of the best-known how-to sites: "3 Steps to Safe Snow Shoveling" and "Tone Your Thighs at Home." Now compare those to stories we found on Wonder How To's homepage the same day: "Hack an Auxiliary Port into your Old Car Stereo for \$3," and "Make a Cheap Light Wand for Dark Photo Shoots Using PVC and Glowsticks." Need we say more? WonderHowTo.com

ZocDoc: Finding the right doctor is harder than it should be: How do you find a specialist? Will they take your insurance? ZocDoc makes it easy. Inform this free service which specialty you need, provide your zip code and your insurance provider, and ZocDoc will not only generate a list but also display available appointment slots and let you schedule an appointment right on the site. ZocDoc.com

News & Reference

These are the sites we visit to stay on top of what's happening in the world and to find answers to our questions.

Amazing Things in the World: This great Facebook page can fill your news feed with spectacular photos of nature, luxury resorts, and other interesting things on planet Earth. [Facebook.com/AmazingThingsInTheWorld](https://www.facebook.com/AmazingThingsInTheWorld)

Astrobiology Magazine: Where better to turn for fascinating information about earth, the origins of life, and the search for life across the solar system than NASA, which sponsors this site. AstroBio.net

Blank On Blank: Journalists contribute recordings of their old interviews, and this site uses them to create new audio and video productions. Relive the heyday of *Mad Magazine* with cartoonist Al Jaffe, or hear Dave Brubeck talk about fighting communism with jazz. BlankOnBlank.org

Co.Exist: This *Fast Company* site reports on groundbreaking innovations, from 3D-printed houses to paint-on solar panels. It has a clean, simple design, and

The Best Education and Career Sites

UNLESS YOU'RE WELLBORN, insanely talented, or just lucky, education is a prerequisite for a career. These sites will help.

CareerBliss: When you're researching jobs, one site is never enough. CareerBliss offers a searchable job board, salary information, and user-contributed employer reviews. Employer ratings aren't based solely on statistical data; they also weigh qualitative points such as work/life balance, positive work environment, growth opportunities, and more. CareerBliss.com

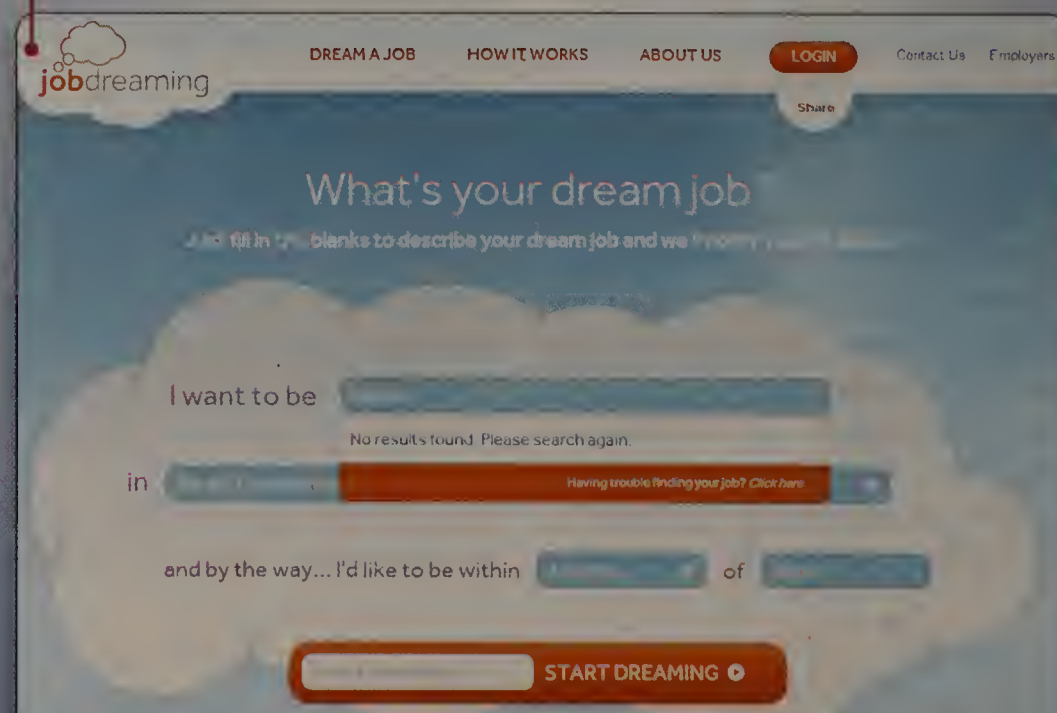
Codecademy: Have you noticed how many companies are hiring programmers as opposed to other professionals? If you're looking for a new career, head over to Code Academy and use its interactive coding platform to gain the skills you need. Codecademy.com

Coursera: This education service partners with A-list colleges and universities to offer dozens of free courses. You can study songwriting with a professor from the Berklee School of Music, take a class in game theory taught by an instructor from the Georgia Institute of Technology, and more. Coursera.org

Glassdoor: Want the inside scoop on a potential employer? Glassdoor gathers anonymous, user-contributed reviews, salary ranges, job interview experiences, and photos from thousands of workplaces. Register with Glassdoor, or log in using your Facebook account, and you can see if any of your connections have experience with the target company. Glassdoor.com

Jobdreaming: Stuck in a dead-end job? Jobdreaming can help. Type in your dream job title, identify the industry you'd like to be in and how much money you want to make; Jobdreaming will try to match your criteria with a recruiter who's looking for someone just like you. Jobdreaming.com

Vizify: The résumé is a necessary part of job hunting, but the plain ol' single-sheet CV is becoming stale. Vizify can spice you up in the eyes of potential employers by compiling your résumé, photographs, portfolio, and data from your social networks into one gorgeous interactive infographic. Vizify.com



a continuous scroll of news stories with beautiful photography. FastCoexist.com

Compost This: If you want to know which materials you can compost, this British site can tell you. (Pasta is a no, because it might attract rats.) The British humor might fly over your head, but you will find quick answers to all your composting questions. CompostThis.co.uk

Film School Rejects: Most publications about the film industry focus more on celebrities than the cinematic arts. The editors at FilmSchoolRejects love movies as much as you do, and it shows in their writing. FilmSchoolRejects.com

Gamasutra: To find out how video games are made, check out this site, which features in-depth articles on the art, audio, design, production, and business of making games. Gamasutra.com

Godchecker: Here's a place where you can meet your maker without giving up the ghost. This mythology encyclopedia boasts some 4000 entries on supreme beings, demons, and deities from nearly every culture. Godchecker.com

Google Street View Gallery: You know about Google Street View, but did you know that Google organizes these photos into galleries? Travel to breathtaking spots the world over from the comfort of your armchair. go.pcworld.com/gallery

Lapham's Quarterly: This highbrow quarterly compiles historical writings on topics relevant to today. Curated by Lewis H. Lapham, editor emeritus of *Harper's*, the site has essays on politics, religion, and social issues. LaphamsQuarterly.org

Politiwoops: Social media is the bane of every politician, making for oh-so-public screwups. Thanks to the Sunlight Foundation's Politiwoops, even deleted tweets remain in public view. Politiwoops.com

Realtalk From Your Editor: This site on Tumblr features animated GIFs discussing problems that editors and writers deal with (such as "When nobody clicks on a piece I think is really, really good") paired with Steve Buscemi's *Ghost World* freak-out: "I can't relate to 99 percent of human-

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Wonderland for Your Inner Nerd. Create, Pontificate, & Receive Kudos for Sharing.

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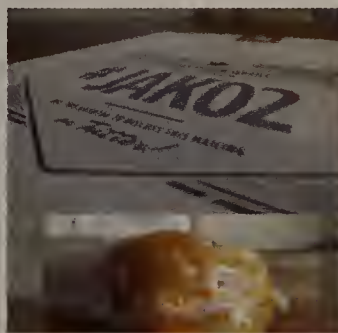
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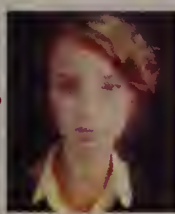
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I was floored when I realized I could subscribe to a Quarterly mailing from my favorite blogger, Jason Kotke, who sent me cheese, sausage, and bitters.



food 22 Feb 2013

Kayn Campbell is a writer, designer, and Inve Collaborative Fund. She also edits VSL.

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ity." Editorrealtalk.tumblr.com

Science Is Awesome: This Facebook page showcases the funny, playful side of science. You can read about an ancient continent buried under the Indian

Ocean, or subject yourself to a stream of chemistry puns. Facebook.com/SciencelsSeriouslyAwesome

Scoopinion: This browser extension tracks the articles you read in order to seek out more stories that match your tastes. It then sends them to you in a weekly email. Scoopinion.com

SideReel: SideReel integrates streaming video links for just about every season of every modern TV show. It links to major streaming services, but also accepts user-submitted links (which might come from not-quite-legal sources). SideReel.com

Smithsonian: Not to be outdone by Google's mapping project, the Smithsonian National Museum of Natural History's Panoramic Virtual Tour lets users explore the museum, room by room, in stunning photos. go.pcworld.com/smithsonian

Wonder How To: You'll find truly useful, if geeky, how-to articles.

Very Short List: This email newsletter delivers curated content on one topic each day.

Stack Exchange: This network of 100 Q&A sites, including developer site Stack Overflow, offers expert answers on topics ranging from mathematics to bicycles to home brewing. StackExchange.com

VirtualGlobetrotting: Armchair travelers can roam freely via user-submitted satellite, aerial, and street-view photos from Google Maps, Bing Maps, and Yahoo Maps. Browse by category, location, or popularity. VirtualGlobetrotting.com

Tools & Utilities

Take advantage of the Internet's collective computational power with these sites and services' powerful tools.

Animoto: Upload your photos and videos, and add words and music, and Animoto's video engine will produce a >>

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high-def video that you can embed in your blog or Facebook page. The free service limits you to 30-second online-only videos (paid plans offer additional features). [Animoto.com](#)

Can I Stream.It? The problem with watching videos online is that popular movies and TV shows are spread across many services. Go to this site, type in the name of the title you want, and the site tells you where you can stream, buy, download, or rent it online. [CanIStream.it](#)

ChronoZoom: Take a visual tour of the origins of the universe, our solar system, and humanity itself via ChronoZoom. The beta site's interactive timeline incorporates photos, videos, and audio. [ChronoZoomProject.org](#)

DidTheyReadIt? Are your emails being read or ignored? This free invisible email tracker tells you when—or if—your message was read, how long it was open, and where it was opened. Now you'll know if your "sick" employee is actually kickin' it at the beach. [DidTheyReadIt.com](#)

Do: This Salesforce.com service helps you manage home and small-business projects with group task lists and notes and the ability to collaborate on documents via Google Docs. Android and iOS users can receive project alerts. A limited version is free. [Do.com](#)

Drinkify: Should you enjoy a martini or an old-fashioned when listening to Frank Sinatra? Specify the recording artist you'd like to hear, and Drinkify will stream their music and suggest the perfect cocktail accompaniment: Sex Pistols: PBR, served cold. Check. Sinatra: Bottle of merlot, with a maraschino garnish. Huh? [Drinkify.org](#)

The Email Game: It's amazing how fast email piles up. This site turns the drudgery of clearing your inbox into a game. You're given a limited time to deal with 30 messages. The faster you go, the more points you earn. But it works only with Gmail and Google Apps, so Outlook and Yahoo Mail users are out of luck. [EmailGa.me](#)

FileHippo: This is a great site for downloading shareware, trialware, and no-cost

software that's free of viruses and spyware. The site retains the old versions of software, so you can revert if you don't like the new one. [FileHippo.com](#)

FontStruct: Can't find a typeface you like? Visit the free FontStruct and you can design your own TrueType fonts

send you a text message if it's going to rain, or have your Facebook photos automatically sync with Dropbox. [IFTTT.com](#)

IMO: If you were sorry to see Meebo disappear after Google acquired it, take a look at IMO. This multi-service instant-messaging client pulls together all your

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About

chat accounts—including AIM, Facebook, Google Talk, ICQ, Skype, and Yahoo—in one browser tab. [IMO.im](#)

Interfacelift: Give your desktop a boost with InterfaceLift. Sift through thousands of gorgeous, user-submitted wallpapers, all of which are free to download. Most images are landscapes, macro photos, or computer-rendered art that you can browse by desktop size. You'll also find user-submitted high-res typeface sets here. [Interfacelift.com](#)

Jotti: Worried that you might have a

malicious file sitting on your hard drive? Upload it to Jotti.org, where 12 antivirus programs, including scanners from AVG, Bitdefender, F-Secure, Kaspersky, Panda, and Sophos, can scan any file up to 25MB. The scan usually takes just a few minutes. [Viruscan.jotti.org](#)

Language is a Virus: This site, designed for people who write creatively for a living, or who just enjoy creative writing, is filled with terrific games and exercises that are sure to get your creative juices flowing. [Languageisavirus.com](#)

Let's Take a Screenshot: Need a quick screenshot of a public website? Give this service a try. It will grab the entire page in one image, including content that scrolls beyond what's visible on your display. Note that it won't capture a site that requires a password; and some sites behind paywalls might block article text from showing up in your newly captured image. [CtrlQ.org/screenshots](#)

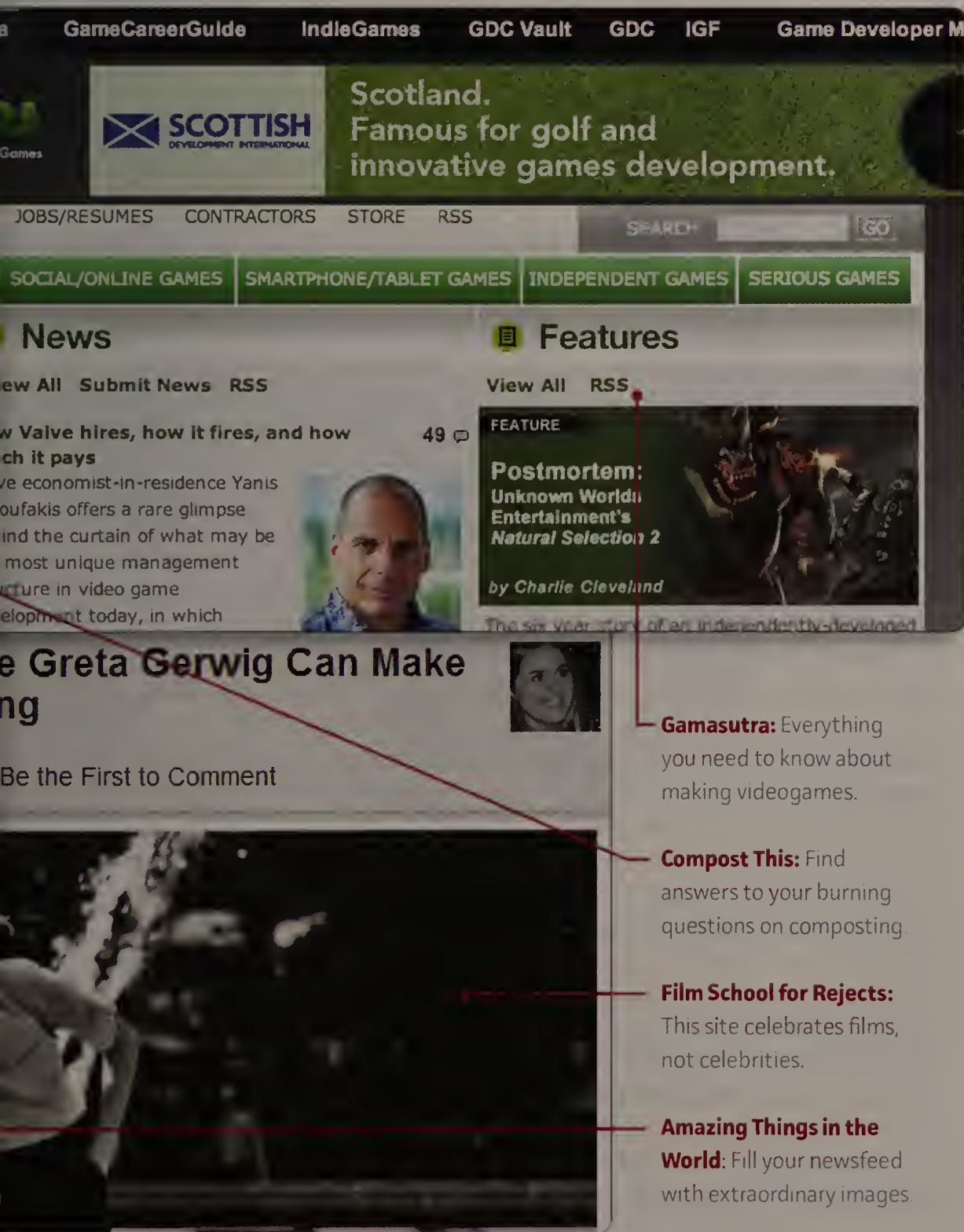
Personal Capital: Intuit's Mint and Quicken get plenty of coverage, but the free Personal Capital is an underrated gem of a personal financial management tool. It presents far fewer ads than Mint does, its tools are far superior, and you can download apps to manage your money on the go. [PersonalCapital.com](#)

PicMonkey: This is the perfect tool for people who want to liven up their photos but can't wrap their minds around advanced editing tools. Upload a photo, and use the site's visual toolset to add text and visual effects, enhance color, remove wrinkles, banish red-eye, and crop and rotate. [PicMonkey.com](#)

Pixlr: Imagine having all the standard tools of a photo-editing package embedded in your browser. Pixlr lets you separate image layers, add filters and layer masks, add effects, and use standard tools such as clone, smudge, and crop. If the advanced tools are too much, switch to basic mode or the Instagram-style service that lets you add filters. [Pixlr.com](#)

Prezi: You don't need Microsoft Office to get great presentation software. With this browser-based tool, you can create presentations that look more sophisticated than what you can achieve with PowerPoint. Yes, it's that good. [Prezi.com](#)

PrintWhatYouLike: This tool turns every element on a webpage—photos, ads, site logos, links, and text—into an editable element so that you can print only the elements you want. Remove background images, hide site margins, increase text size, and more. PrintWhatYouLike can be unruly until you're used to it, because *everything* can be delet-

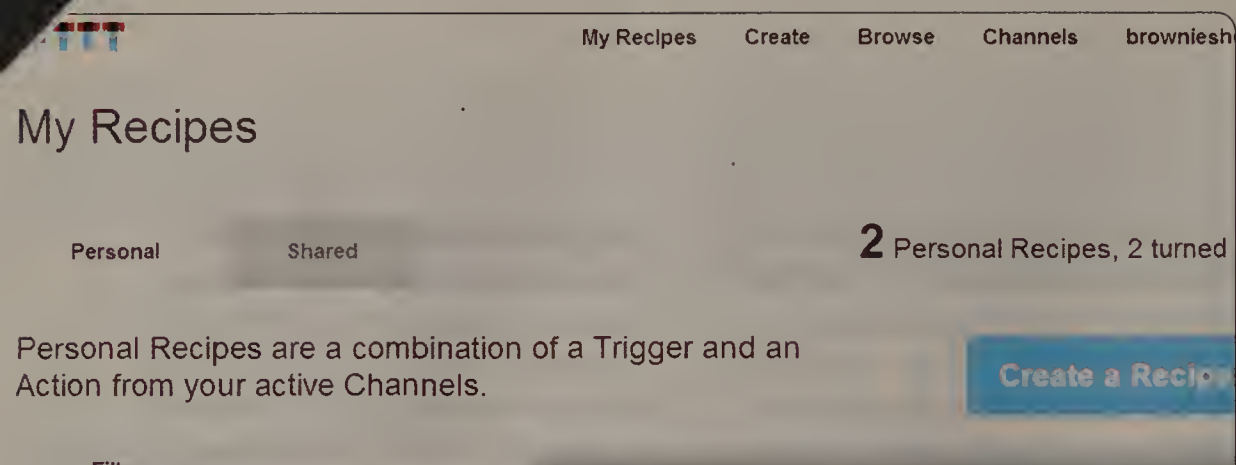


Gamasutra: Everything you need to know about making videogames.

Compost This: Find answers to your burning questions on composting.

Film School for Rejects: This site celebrates films, not celebrities.

Amazing Things in the World: Fill your newsfeed with extraordinary images.



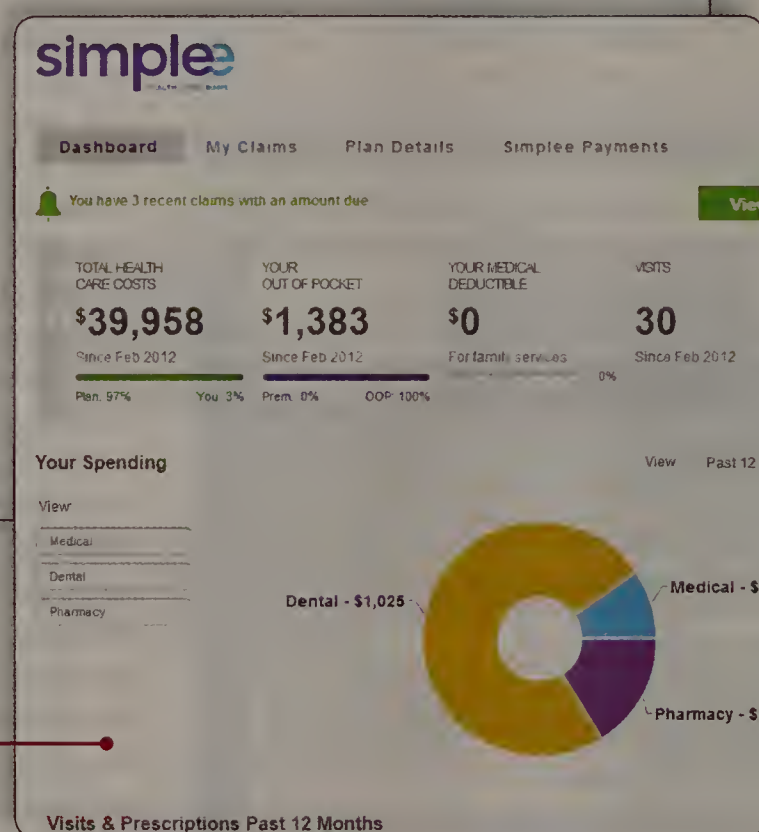
if  the

WeMo switch on

if  the

IFTTT: This site lets you set up alerts, triggers, and status updates.

Simplee: Track what you spend and owe on your medical expenditures.



ed, enlarged, or singled out for printing. [PrintWhatYouLike.com](#)

The Public Domain Review: Troves of media become free each day, thanks to expiring copyrights. We monitor The Public Domain Review to stay on top of the coolest, quirkiest items. The blog highlights works just entering into the public domain. You can visit daily to find new archival footage, vintage magazines, and photos; or have the best items delivered to your inbox every two weeks. [PublicDomainReview.org](#)

RouterPasswords: So your friend asks you to fix his wireless network, but he's lost the router's admin password. You can reset the router to its default state, but you still need to know the default password to get into the firmware settings. Visit [RouterPasswords](#) (on your phone, since your friend's router isn't working) and enter the router's brand and model number, and the service will display the

router's factory-default login information. [RouterPasswords.com](#)

Simple: Not to be confused with the insurance-related Simplee, below, Simple is a tech-friendly bank alternative (don't worry, your money remains FDIC-insured) with a Mint-like interface. It categorizes your financial transactions and generates reports you can use to analyze your spending habits. [Simple.com](#)

Simplee: Death, taxes—and medical bills—are life's inevitabilities. Simplee can help you track the latter. Punch in your insurance and other medical-related logins, and it will draw lovely charts illustrating how much you're spending or owe on prescriptions, doctor visits, and surgeries. [Simplee.com](#)

Self Nutrition Data: Know what you're putting in your mouth with *Self* magazine's free database that's packed with nutritional information from USDA databases. You can not only track the calories

you're eating but also research food allergies, look up ingredient lists, and calculate your overall nutrition needs.

[NutritionData.Self.com](#)

Sleepyti.me: Lack of sleep kills productivity; it also affects metabolism, memory, and cardiovascular health. Sleepyti.me's simple calculator determines what time you should fall asleep based on your target wake time; the utility tracks your natural sleep cycles and then wakes you between cycles so you get the best start to your day. [Sleepyti.me](#)

Slydial: Have you ever hoped your phone call would go straight to voice-mail instead of having the person answer? That's what happens when you use Slydial. The service works with any U.S. mobile phone number: Just dial 267-SLYDIAL (267/759-3425) and enter the number. Slydial also offers Android, BlackBerry, iOS, and Windows Mobile smartphone apps. [Slydial.com](#)

The Quiet Place: This site simply offers a 90-second breather from email alerts, social updates, and instant mes-

sages. And unlike other relaxation sites, The Quiet Place doesn't feature a cheesy voice trying to get you to relax. Instead, it soothes you with the familiar life-and-death theme from TV's *Lost*. (Of course, listening to the *Lost* theme may well have you wondering all over again what that light at the center of the mystery island was supposed to be.)

[TheQuietPlaceProject.com/90seconds](#)

Wolfram Alpha: Need to know the date 180 days from now, or the population of Chicago? Wolfram Alpha is your go-to source for basic facts that are hard to uncover on Wikipedia or Google. The so-called computational knowledge engine gives you instant answers to natural-language questions. Students can use Wolfram Alpha to help correct their algebra and geometry homework. The tool can also analyze your Facebook presence and deliver fascinating information about it. [WolframAlpha.com](#) ●

Snap a photo of this page and text it to qn2a@agm.tw and get a special video of James Denton and friends turning the big Q into an A.

QN2A.ORG

INTRODUCING THE QN2A PROJECT

ANSWER CANCER WITH BETTER QUESTIONS

Dr. Shayma Kazmi
Medical Oncologist



Sara Faccio
Survivor



James Denton
Stand Up To Cancer
Celebrity Ambassador



With cancer, having questions doesn't make you weaker. It makes you stronger. The more you ask, the more you know, and the more you can stand up to cancer. So we've created QN2A.org, a powerful new online resource of all the Big Questions that can help both patients and caregivers after a cancer diagnosis. Discussing these questions

with your healthcare professional can help you collectively arrive at the treatment plan that's best for you—turning those questions into answers. And while you're at QN2A.org, help us grow the list by sharing the questions that helped you the most. Together we can find the right answers. Without question.

James Denton, Stand Up To Cancer ambassador, has helped family members navigate their cancer treatment. Stand Up To Cancer is a program of the Entertainment Industry Foundation (EIF), a 501(c)(3) charitable organization.



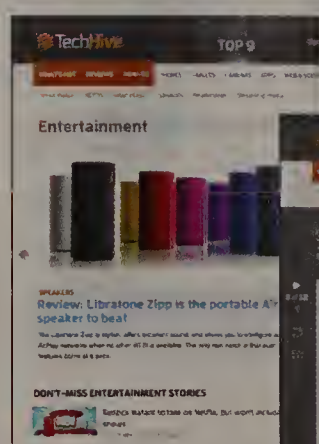
Winning the fight against cancer every day*



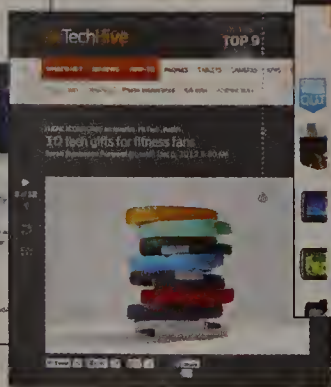


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Your Portable PC Survival Kit



**When Web
utilities won't work,
don't give up hope:**
A properly loaded thumb drive
can fix PC hassles in a flash. »

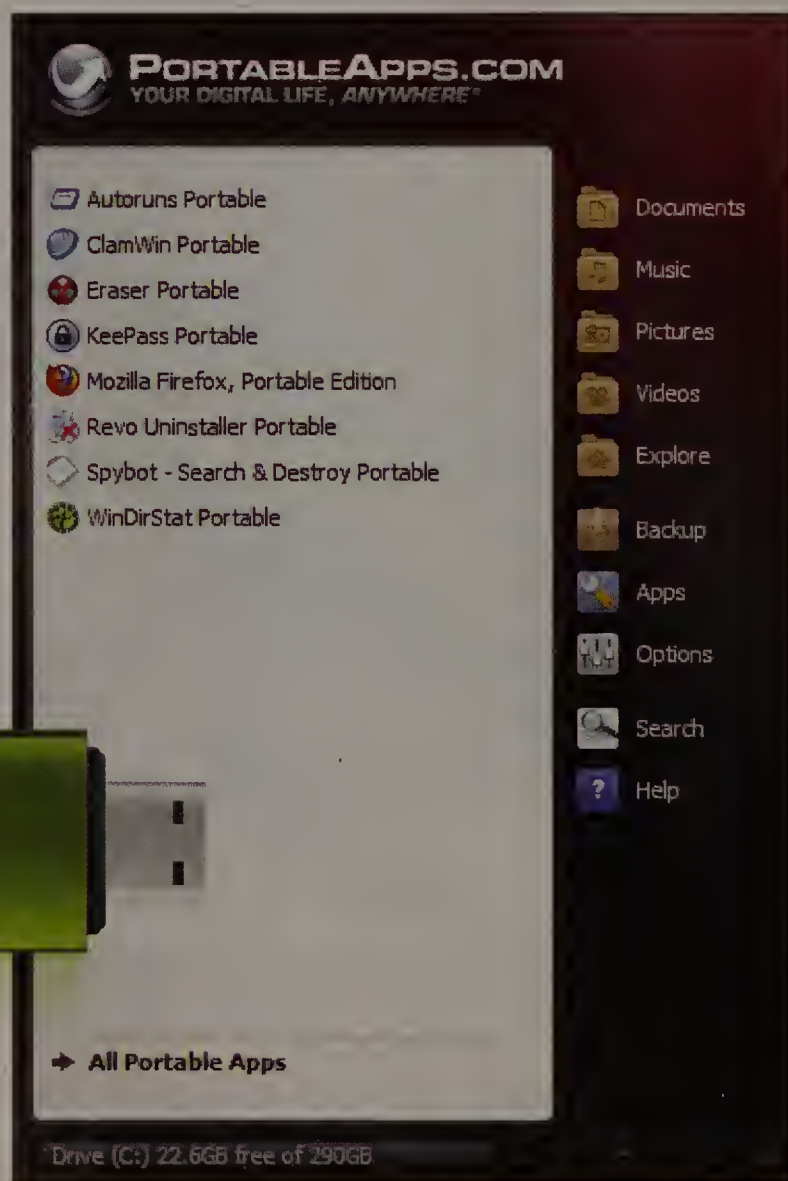
BY ALEX CASTLE | ILLUSTRATION BY JOHN HARWOOD

If you're using a flash drive merely as a vehicle for simple file transfers, you're missing out on the best role that one of these tiny data buckets can fulfill. Enthusiasts know that flash drives are the perfect portable repositories for all sorts of software that can breathe life into an otherwise ailing PC.

All the Web apps in the world won't help you when your computer breaks down or falls prey to a particularly nasty piece of malware and refuses to connect to the Internet. A properly loaded USB drive, on the other hand, can be a machine saver. And when a relative calls with news of a dire tech emergency, you'll be glad to have an always-ready "ninja drive" to slip into your pocket as you run out the door.

In this article I'll show you how to load a USB drive with everything you might need to deal with a PC emergency. The next time your computer breaks down, don't panic. Instead, take a deep breath, plug in your ninja drive, and start making things right.

PortableApps gives you quick access to 'portable' free programs that you can install on removable media and then use on any PC.



PORTABLEAPPS

The first thing you'll want to install on your USB rescue drive is PortableApps (portableapps.com/download), a free, open-source platform for installing desktop applications on USB drives and other removable media. PortableApps manages the installation of new portable software on your USB drive, and it also acts as a front end when you're actually using the USB drive, allowing you to browse and launch applications easily.

PortableApps maintains a list of hundreds of "portable" versions of popular free programs, each of them designed to work without installation. For the complete list, see portableapps.com/apps.

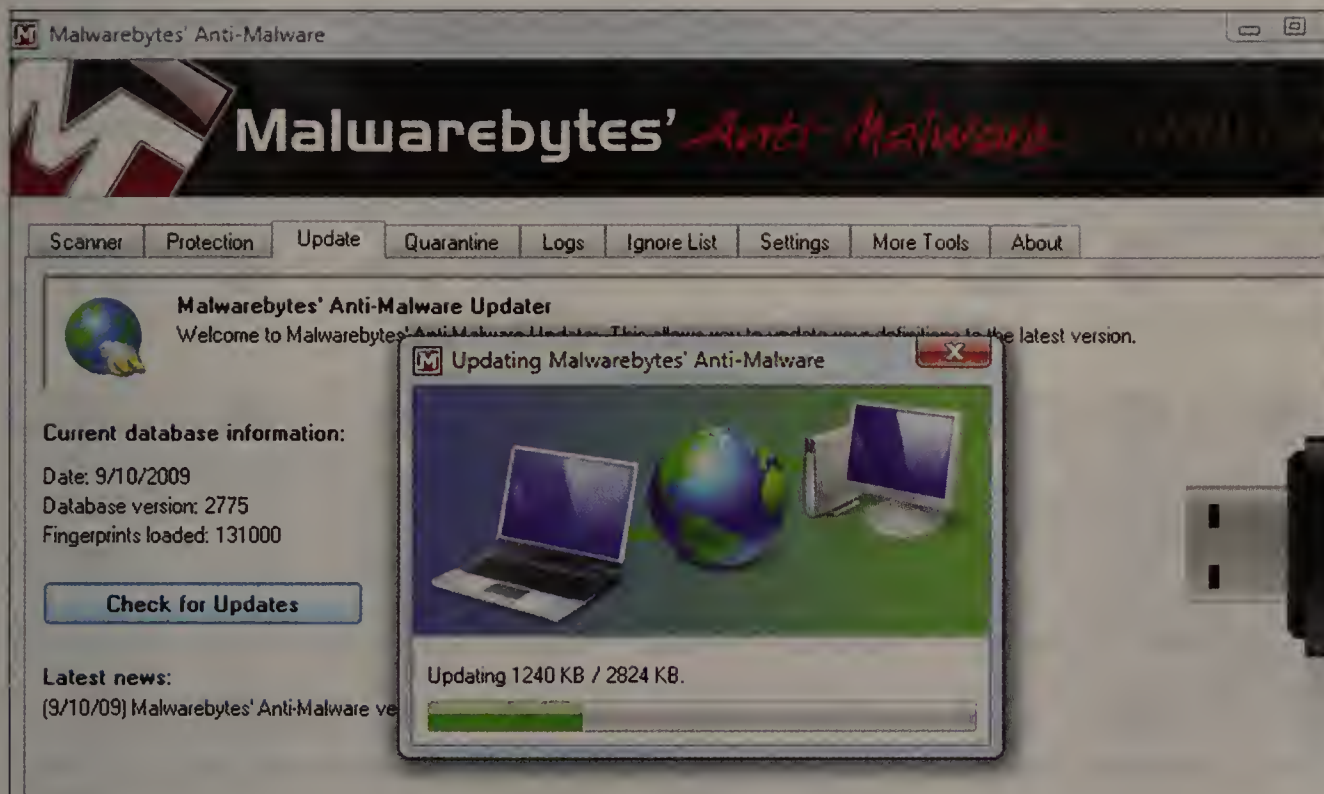
Each of the following applications that has "Portable" in its title is available for the PortableApps platform. You can download these items at the URLs provided, or start PortableApps and click *Apps* ▶ *Get More Apps*. You'll see a large list of applications; just check the ones you want and then click *Next* to download and install all of them automatically.

CHROME PORTABLE

Even though it's not a maintenance application, strictly speaking, a mobile browser such as Chrome Portable (go.pcworld.com/chromeport) is a great item to add to your emergency thumb drive. Since a lot of malware is designed to target Web browsers, your browser is one of the most likely components of your system to be out of commission or otherwise compromised. Chrome's sandboxing security feature and Safe Browsing functionality—which guards against malicious sites and downloads—make it one of the better options for messing around on a potentially infected system.

SPYBOT SEARCH & DESTROY PORTABLE

If your PC is running sluggishly because of malware, Spybot Search & Destroy (go.pcworld.com/spyport) should be the first—and typically last—weapon in your



Malwarebytes finds and eliminates brand-new threats more efficiently than traditional antivirus software does.



arsenal. It's one of the oldest and best spyware-removal suites around, and it should be able to weed out most malware on even the slowest of machines.

CLAMWIN PORTABLE

ClamWin (go.pcworld.com/clamport) is a Windows graphical interface for the Clam open-source antivirus engine. Since this version isn't an installed antivirus application, it doesn't provide real-time scanning, but the portable version nevertheless offers powerful on-demand virus scanning for any suspicious files.

MALWAREBYTES

Despite the fact that a number of unofficial tech-support geeks choose Malwarebytes (malwarebytes.org) as their go-to malware scanner, it doesn't come in a portable version. You can, however, save the Malwarebytes installation file to your USB emergency drive and then unpack the application directly onto the afflicted machine after you've made a first attempt at nabbing the badware using both Spybot and ClamWin.

Why use Malwarebytes if you have already scanned your system with the

fine pair of programs described previously? For one thing, a second opinion never hurts when you're dealing with a virus-ridden computer. More important, however, testing shows that Malwarebytes eradicates zero-day exploits (read: new threats) more efficiently than the average antivirus software does. The program's Chameleon feature even keeps it running when a nasty bug attempts to block traditional antivirus scans. Malwarebytes isn't so hot at eliminating known malware, though, which is why you'll want to use it in conjunction with the other security programs.

KASPERSKY TDSSKILLER

If you've tried running the aforementioned malware-removal programs, but your computer is still exhibiting symptoms such as bogus error messages or browser hijacking, you might be dealing with a rootkit. Designed to conceal malware running on your system, rootkits can be very difficult to detect themselves. If you suspect that your computer might be infected with one, try running TDSSKiller (support.kaspersky.com/5350), a rootkit scanner from

Kaspersky. Simply leave the .exe file on your thumb drive, and run it on the troubled computer. The utility will find and remove most rootkit malware.

FILEASSASSIN

Even if you're not trying to uninstall whole programs, deleting files can prove challenging—especially when you're troubleshooting an infected system. Windows might tell you that access to a file is denied, or claim that another program or user is currently using it, or indicate in some other way that the file you want gone isn't going anywhere.

FileAssassin (go.pcworld.com/assassin) lets you get around those roadblocks and delete any file you wish. Make sure you really want the file gone, though.

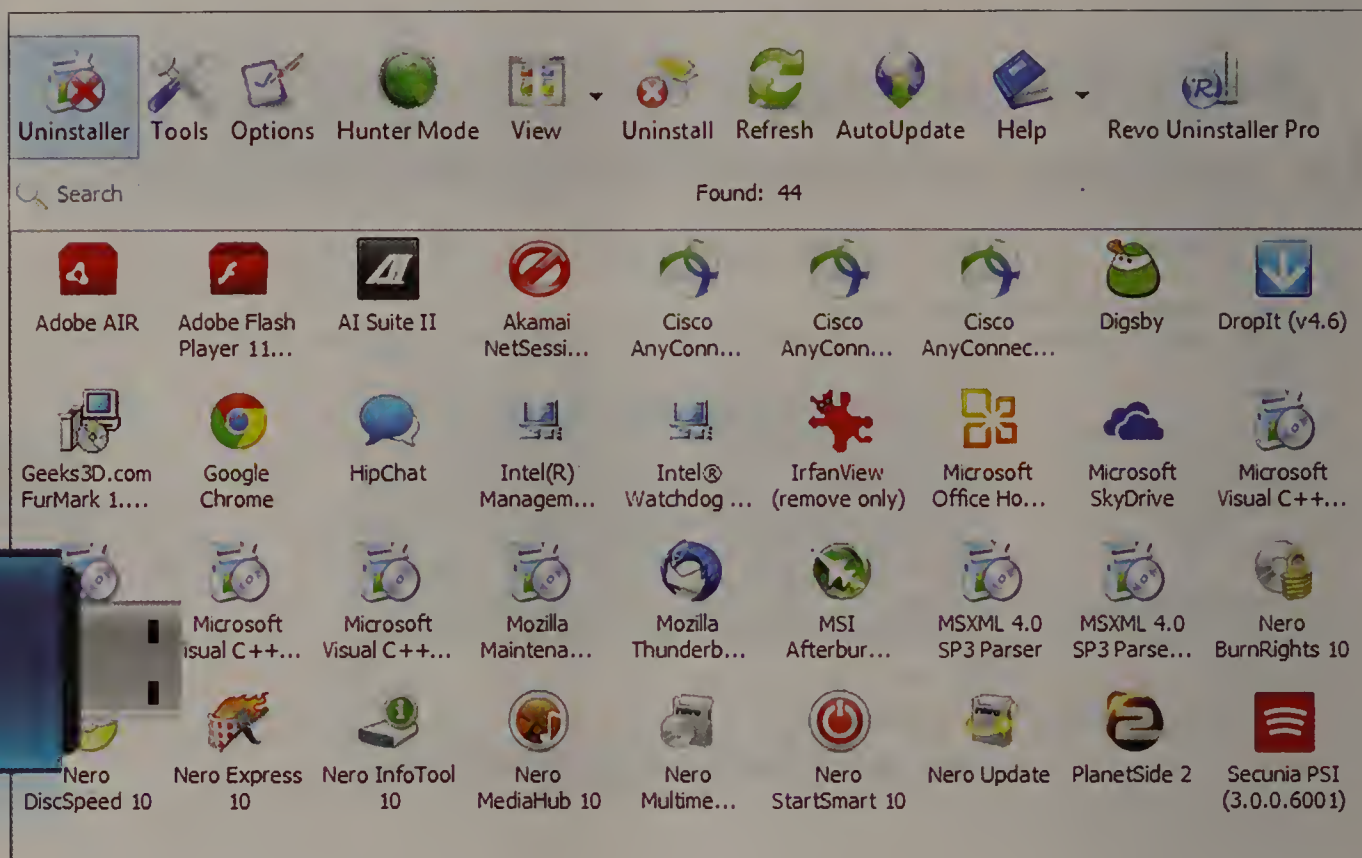
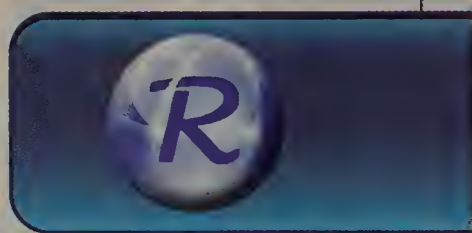
When you go to download this program, be careful to grab the portable version, at the bottom of the list.

ERASER PORTABLE

Sometimes the problem isn't that you can't delete a file, but that you want to be sure a supposedly deleted file is absolutely gone. If you need to delete sensitive documents or files, use Eraser >>

Revo Uninstaller

deletes an application in its entirety, removing the bits that built-in uninstallers leave behind.



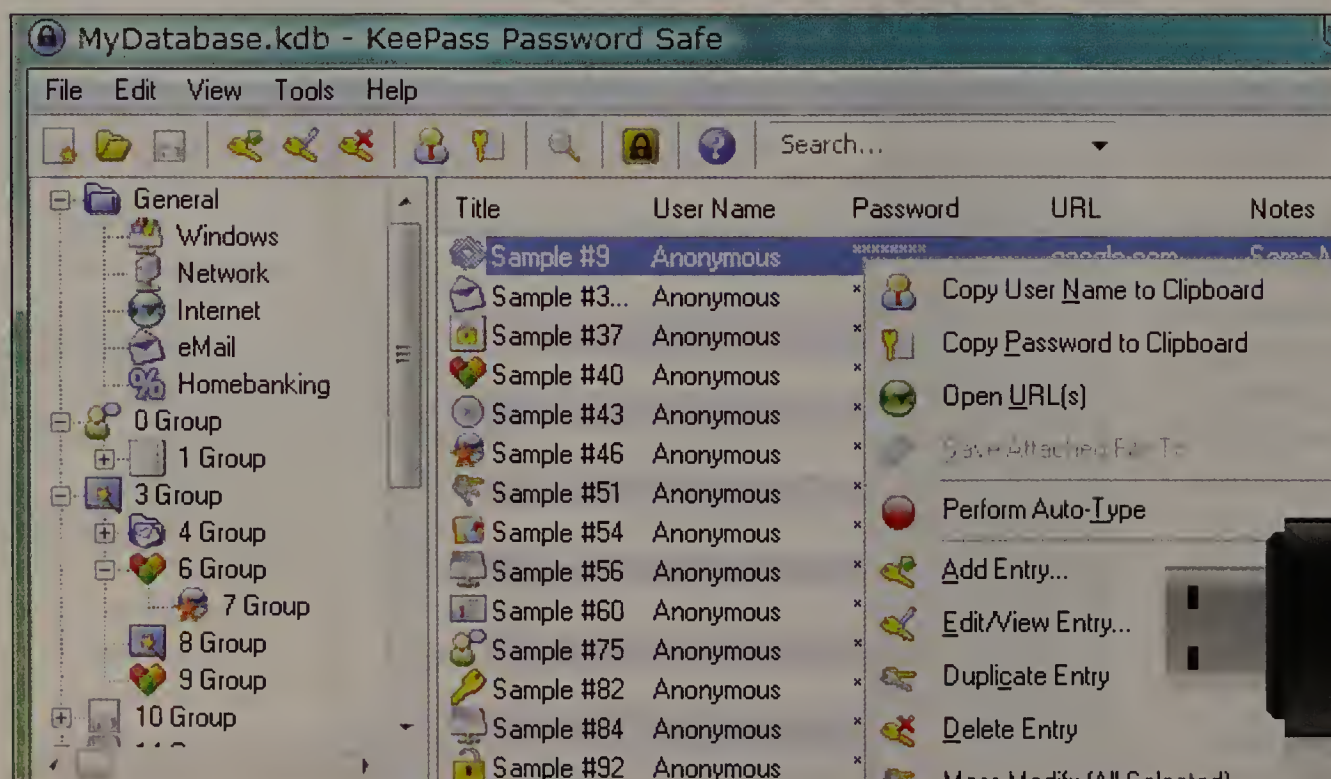
(go.pcworld.com/eraserport), a tool for securely erasing and overwriting files and directories on standard mechanical hard drives. (The wear-level algorithms in solid-state drives, however, negate its ability to securely wipe data from them.)

Eraser includes several removal methods of increasing length, all of which repeatedly overwrite the hard-drive sec-

tors associated with the deleted data to ensure said data's utter obliteration. Although the utility permits secure deletion of specific folders and files, you can alternatively use Eraser to overwrite all of the empty space on a disk, guaranteeing that anything you've deleted from the drive in the past is gone forever. Just be mindful of what you're deleting.

REVO UNINSTALLER PORTABLE

One of the simplest ways to get a grid-locked computer running smoothly again is by removing unnecessary programs. This approach has two benefits: You clear hard-disk space, which can speed up your computer, and you cut back on the number of apps launching at



KeePass Portable

encrypts your password database and guards against keylogging malware.



startup, which can reduce the boot time.

You can uninstall programs by hand, but that's slow going and you might not always remove the unwanted programs' components in their entirety. Instead, keep a portable copy of Revo Uninstaller (go.pcworld.com/revoport) ready to quickly uninstall as many programs as you desire. Revo is much more efficient than the typical application's baked-in uninstaller: While most software uninstallers may leave bits and pieces scattered around your system, Revo deletes everything associated with a program. Buh-bye, ghost (files) in the machine!

AUTORUNS PORTABLE

One of the main reasons that older systems gradually slow down is that they tend to accumulate programs and services set to run automatically at startup. Sysinternals' Autoruns (go.pcworld.com/autoport) is a powerful app capable of showing you every process that starts with your computer, along with other common sources of trouble, such as browser toolbars and shell extensions.

Instructing a process not to run at startup is as simple as unchecking a box, though that simplicity can also be a minor drawback: As with Eraser, in Autoruns you'll want to be sure of what you're clicking before you click it, to avoid disabling a critical startup process.

KEEPASS PASSWORD SAFE PORTABLE

If you use KeePass to store your passwords (and if you don't, you should think about trying it), you might wish to store both KeePass Password Safe Portable (go.pcworld.com/keepport) and your password database on a thumb drive. That way, you'll always be able to access your assorted online accounts, no matter what computer you're using. Even better, you won't have to worry about identity theft if you happen to lose the USB drive, because the KeePass database is encrypted and requires a master password.

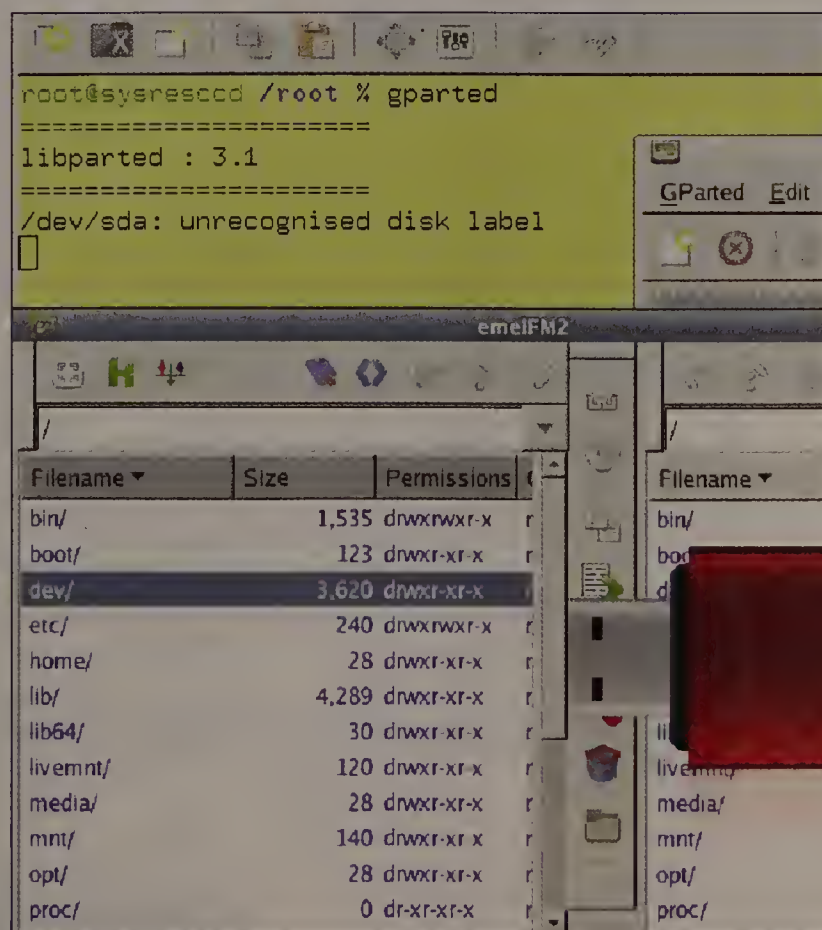
Though you'll want to avoid logging in to potentially infected PCs with KeePass, the software employs some nifty tricks to defeat keylogging malware. For instance, KeePass's Autotype feature automatically pastes your stored passwords into their

appropriate fields; and you can instruct the program to ask for your master password in a Windows UAC prompt, which protects it from any software keylogger that isn't running with Administrator rights on your machine. ●

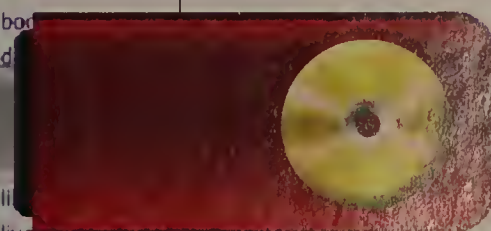
The Other USB Drive: SystemRescueCD

IF YOU WANT to be thoroughly prepared for a worst-case PC catastrophe, you can go one step further than simply creating an emergency-app thumb drive. By loading a second portable drive with a live install of the SystemRescueCD (www.sysresccd.org) operating system, you'll be ready to undertake recovery operations even if your computer's OS is so wrecked that you can't log in.

SystemRescueCD is a free live operating system, meaning you don't have to install it on a hard drive. Just insert the SystemRescueCD USB drive into the troubled computer, restart the machine, and boot from the thumb drive. The Linux-based OS comes equipped with software that you can use to access the data on your hard drives and back it up across the network, along with various other handy-dandy utilities—basically, everything you might need to fix (or at least recover) as much of your broken OS as possible. The makers of the distribution were even kind enough to provide detailed, step-by-step instructions on how to get a SystemRescueCD live drive up and running (go.pcworld.com/sysresinstall).



System-RescueCD contains GParted and several other utilities for PC troubleshooting and recovery.



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THE DIRTY AND DANGEROUS SIDE OF TECH

Your gadgets are full of stuff that could hurt the environment, other people—and you. >>

BY LINCOLN SPECTOR



You may have a laptop, a desktop computer, a tablet, and/or a smartphone. If I were to ask you what was inside your chosen device, you would likely mention a hard drive,

flash storage, RAM, or a processor. Some people might even say, "I have no idea. I think it operates by magic." Very few would mention arsenic, lead, and mercury. Yet most of our gadgets contain these or other elements and chemical compounds that are dangerous to us and our environment.

I'm not trying to be an alarmist. I love tech, and I always will. I want the lightest yet fastest laptop, the coolest smartphone, the biggest HDTV, and a professional-quality sound system. But I can't remain blind to the inconvenient fact that our tech contains poisons. Our electronics use thousands of raw elements and mixed compounds—most of which remain inert while we operate our gadgets, but which can do considerable harm before we buy our devices and after we discard them.

We take our smartphones, computers, and HDTVs for granted, assuming that their only price is what we paid at the regis-

ter. But our gadgets are filled with substances that damage the air and water where they're mined, manufactured, and disposed of. And some poisons make their way back to us, the users.

Usually, but not always, the victims are workers who live in distant countries. Some toxic substances leach out of hardware in the course of regular use, or when the device gets damaged. A broken monitor or LCD HDTV, for instance, could expose you to mercury. And every contaminated river in the world empties its toxins into the oceans that we all depend on.

The European Union bans or tightly controls many of the materials involved. Such restrictions can eliminate or significantly reduce their use elsewhere, since companies would rather not deal with two separate manufacturing processes.

But Barbara Kyle of the Electronics TakeBack Coalition (electronicstakeback.com) doesn't find the news all that good. "They've stopped using certain chemicals, but what we don't know is what they've been using instead," she told me in a phone interview. "The replacements aren't necessarily better."

Product Life Cycle: The Three Biggest Danger Points

1 Extraction: Mining destroys land, and it often poisons the air and water around it. Mining some scarce minerals may not be possible, or profitable, without using processes that cause serious environmental harm.



What can you do about this problem—aside from selling your car, growing your own food, and swearing off electricity?

First, take into account more than your finances when you consider buying a new gadget. Ask yourself if you could hold off making a purchase. If you buy a new phone every three years instead of every two, you reduce the impact by a third.

Second, when researching what to buy, check the manufacturer's environmental standing. The Ecology Center and iFixIt have a useful listing of smartphones (ranked according to their toxicity), which is available on HealthyStuff.org. For PCs, check the EPEAT Registry Search (go.pcworld.com/epeatreg). And for a general view of companies' environmental practices, check out the *Greenpeace Guide to Greener Electronics* (see page 85).

Third, get rid of your dead and obsolete tech conscientiously. Instead of having the manufacturer recycle it for you, visit the Find e-Stewards Recyclers page (go.pcworld.com/recycler) to see how you can responsibly recycle your tech. You'll find useful information on the Electronics TakeBack Coalition's Recycle it Right page (go.pcworld.com/recycleit). If your tech item is still in good working order, consider reselling or donating it.

Finally, know what you're dealing with: What are the more dangerous substances used in your tech? Starting on the next page, read about nine of the most troublesome materials—both pure elements and compounds—commonly found in tech gadgets. You may have most of them within arm's reach.

Your computer, smartphone, television, and other tech toys almost certainly contain these materials—arsenic, beryllium, cadmium, lead, mercury, phthalates, polyvinyl chlorides, brominated flame retardants, and rare-earth minerals. But we can make our tech—and ourselves—safer just by being aware of the impact our devices have. When possible, fix gadgets instead of replacing them; resell or donate outdated tech; buy items with less packaging; avoid buying cheap, short-lived products; and make sure that you responsibly dispose of broken devices. If we can build a smartphone capable of connecting to the Internet in the blink of an eye, surely we can keep that phone from winding up in a landfill when the next great device comes along.

Aviva Prager, an environmental studies/politics major at Whitman College in Washington, assisted in research for this article. >>

2 Manufacturing: You don't have to handle the basic ingredients that go into your tech. But someone does, often at high temperatures that release toxins into the air. Tech factory workers often suffer unusually high rates of cancer and other deadly diseases. (The South Korean government recently blamed Samsung for the breast cancer death of a factory employee.)



3 End of life: You probably know better than to throw your old phone into the garbage. You recycle it. (Right?) But what does that actually mean? Far too often, it means that the phone gets shipped to a developing country like Ghana, where salvagers disassemble it and reuse the parts that have value. The rest, much of it toxic, likely ends up in an unprotected garbage heap.





Smartphones

Rare-earth minerals

Unless you study the periodic table for fun, you may never have heard of europium, promethium, thulium, or yttrium—four of the elements

known collectively as *rare-earth minerals*, *rare-earth metals*, or just *rare earths*. As their name implies, they are hard to come by.

And they're needed. Look close enough, and you'll find them in smartphones, magnets, and HDTVs. They're also important ingredients in many "green" technologies including wind turbines, electric cars, and compact fluorescent light bulbs.

Mining and purifying rare earths, though, are anything but

green processes. The world's center for rare-earth mining is the city of Baotou in Inner Mongolia, China, where, according to the UK-based *Guardian Weekly*, "The foul waters of the tailings pond contain all sorts of toxic chemicals, but also radioactive elements such as thorium which, if ingested, cause cancers of the pancreas and lungs, and leukemia."

Some companies are searching for greener ways to mine and process rare earths. How successful such efforts will prove to be remains an open question, however.

Mining for rare earths to make smartphones can be a significant source of pollution.

Brominated flame retardants

When they first came out, chemical flame retardants seemed to be a great

idea. After all, you don't want your gadgets to burst into flames. But you don't want your future children to be born with birth defects, either. It shouldn't be a choice of one or the other.

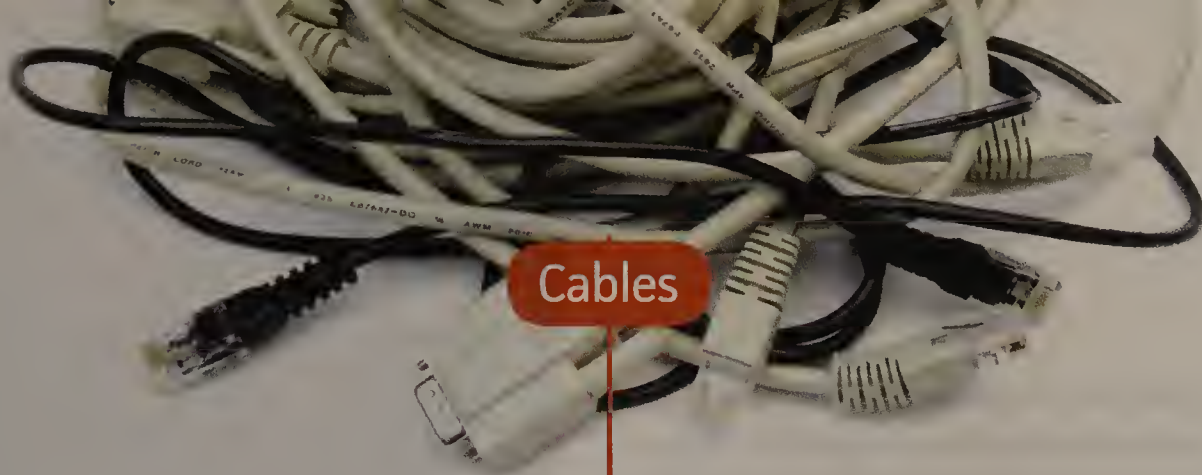
Brominated flame retardants (BFRs) comprise several chemicals that are added to gadgets (and to nontechy products, such as furniture) to reduce their likelihood of catching fire. Many of them, including polybrominated diphenyl ethers (PBDEs), are persistent—once they get in your body, they stay there. And as

more of these compounds enter your body, they accumulate.

Studies have shown that PBDEs can affect brain development in the womb, cause birth defects, and interfere with the human hormonal system; they may also be carcinogenic. The biggest dangers they pose are for the people who assemble and disassemble the products. But it's also possible for consumers to be exposed, especially—ironically enough—through a fire.

Your phone may contain BFRs, but they're likelier to be in your monitor or TV. Or your couch and your children's clothes.

Many companies are now shying away from BFRs and looking for alternatives. Whether those alternatives will actually be an improvement only future research may be able to determine.



Cables

Polyvinyl chlorides

Usually abbreviated as PVC, polyvinyl chloride is a common plastic used in all sorts of things. It's in the outer shell of the cables connecting your devices, and it probably surrounds your laptop's power brick. It's in your music collection if you have vinyl LPs. It's in clothing and pipes. It's cheap, durable, and ubiquitous.

But it's also, according to Greenpeace IT analyst Casey Harrell, the "worst of all plastic." PVCs have been associated with hormonal imbalances, reproductive problems, and various forms of cancer.

PVCs "can't be properly recycled," Harrell told me in an interview. So old material usually gets thrown into a dump site or, worse, burned to retrieve copper wire or other valuable stuff inside. When burned, it can create a harmful, carcinogenic dioxin. And in landfills, chemicals leach out, likely contaminating water supplies. The "only way to [dispose of it] properly is to send it to a hazardous waste center," Harrell says.

The good news is that some tech companies, such as Apple, have stopped using PVCs.

Phthalates

On their own, polyvinyl chlorides are quite stiff—which is why phthalates (pronounced THAL-ates) go hand in hand with them. Phthalates soften up PVCs, making them flexible without weakening them. Without phthalates, a cable coated with PVCs couldn't bend easily.

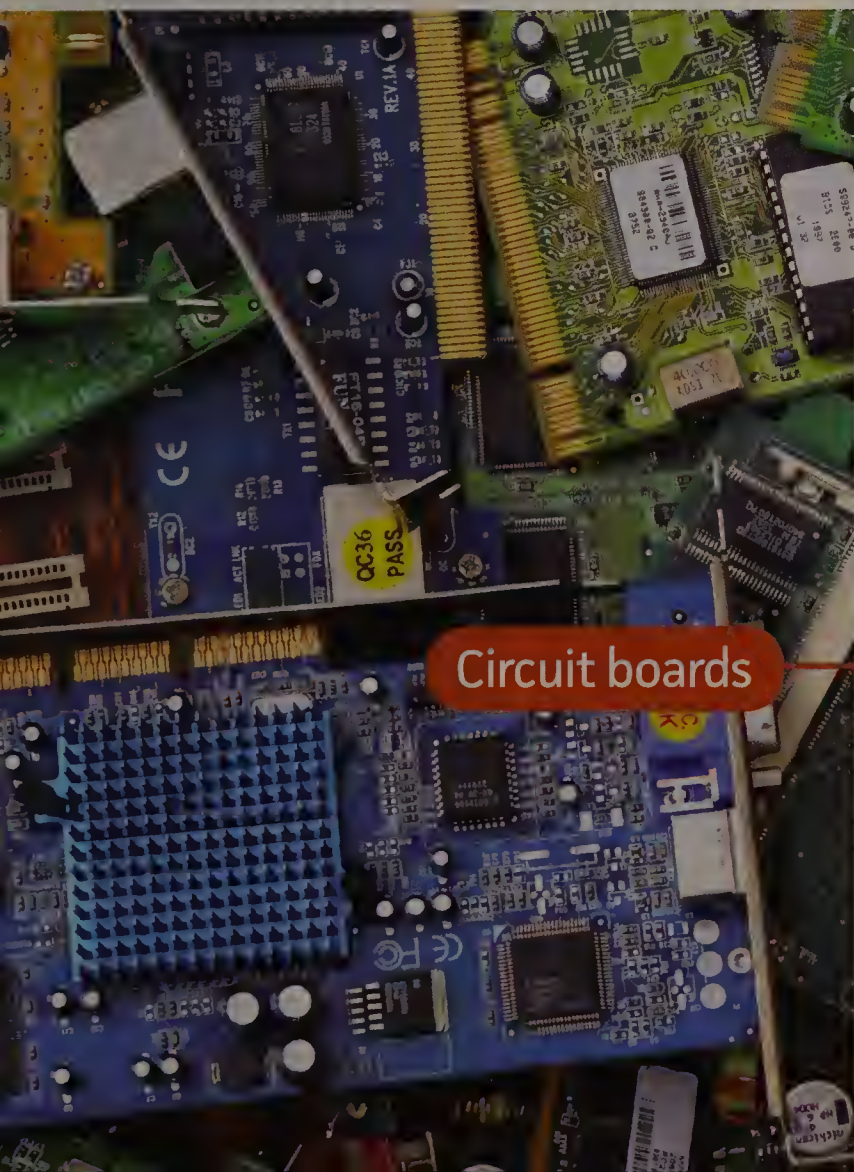
PVCs are ubiquitous. Cables for your devices come covered in PVCs and phthalates.

Phthalates are common not only in electronics, but in such products as tablecloths, shower curtains, and toys—at least toys sold in the United States. Phthalates are illegal in children's toys sold in the European Union. According to

HealthyStuff.org, phthalates can "disrupt normal hormonal processes, often at low levels of exposure," and they are linked to birth defects, asthma, and maybe breast cancer.

Phthalates don't threaten only people far away. They can leach out of your products and into your body. A federal government study cited by HealthyStuff.org found phthalates "in almost all of the population, with the highest levels in children ages 6 to 11 years and in women."

Fortunately, as PVCs disappear, so will phthalates.



Circuit boards

Beryllium

It sounds like a superhero: Stronger than steel, lighter than aluminum, and able to conduct electricity in a single bound (or at least to conduct it really, really well). Add a dollop of the element beryllium to copper, and you have an alloy that is six times as strong as pure copper on its own. That strength makes the alloy a great fit for parts such as springs, connections, and circuit boards.

But for the people who have to work with beryllium (a difficult-to-mine rare-earth metal), it's more like kryptonite. Grinding, shredding, and other manufacturing and disposal processes produce a fine beryllium dust that can enter workers' lungs. The dust can also contaminate their clothes and shoes, and, by that route, may eventually poison their families.

According to a Greenpeace paper, *Toxic Tech—Chemicals in Electronics*, "beryllium is both acutely and chronically toxic to humans, mainly affecting the lungs." People exposed to it can suffer from chronic beryllium disease, whose symptoms include shortness of breath, fatigue, chest and joint pain, loss of appetite, and scarred lung tissue. CBD has no known cure. The International Agency for Research on Cancer classifies beryllium and beryllium compounds as group 1 carcinogens—those most likely to cause cancer in humans.

Beryllium is a toxic, carcinogenic rare-earth component of electronic circuit boards.

Lead

This common element has been making people sick since the days of ancient Rome. Today, manufacturers use lead to solder electronics, making it an ingredient in some circuit boards. It's a standard component of cathode-ray tubes; you may still have a CRT monitor or TV in your home.

If it finds its way into your body, lead can damage your nervous system, your kidneys, and your reproductive organs. It's especially bad for children, impeding brain development.

As Greenpeace's Harrell describes it, lead is "most dangerous to expecting women. It's really bad for the very young. It's not good for adults, either."

A 2004 EPA study of electronic items found that they leached lead in concentrations high enough to be considered hazardous.

And you don't even have to be using tech devices to be exposed. It was common in paints and toys until a few decades ago, and some of those products are still around.

The good news is that lead is much less common in products today than in the past. The European Union restricts lead; and overall, according to Harrell, a significant decrease in its use has occurred.

That old CRT in your garage contains lead, which makes carefully disposing of it a must.

Cathode-ray tubes



LCD screens



Mercury is in the fluorescent lights that may backlight your screen's LCD.

Mercury

Because it significantly reduces

electricity consumption and greenhouse gas emissions, the compact fluorescent light bulb (CFL) has become a symbol of green technology. But the mercury in a CFL produces hazardous waste when the bulb breaks. And the fluorescent lights that backlight your LCD screen may be just as bad.

If too much mercury gets into your body, it can affect your central nervous system, digestive system, and kidneys. In the womb, it can impede brain development.

You've probably heard about people getting mercury poisoning from eating fish. That's not entirely separate from the fluorescent light problem. Mercury can't hurt you while it's contained in a lighting element or monitor; but when such a device is broken and thrown away or incinerated, the mercury inside can escape into the ground, flow into the water table, and eventually enter the food chain.

Not all of that mercury comes from fluorescent lights, of course. Mercury is also used for medical purposes and in the manufacture of industrial chemicals, and it has been used in the past in thermometers and cosmetics.

Fortunately, more and more LCD screens these days use LEDs (light-emitting diodes) rather than fluorescent backlighting. But plenty of mercury remains in various products, and you probably have some of those products in your home.



Arsenic

You probably already associate the word *arsenic* with poison, perhaps in connection with some old murder mystery. Even when ingested in amounts well below what would constitute an immediately fatal dose, arsenic can do plenty of harm.

If it builds up in a human body, arsenic—a metalloid element—can weaken the immune system and damage the kidneys. It has also been associated with lung, skin, and bladder cancer.

Until a few years ago, arsenic was an important ingredient for doping circuit boards: Manufacturers would add a small amount of the element to the silicon, enabling it to conduct electricity better. As such, arsenic posed no significant danger to consumers, but it presented a serious one to workers manufacturing or disposing of circuit boards.

Arsenic has largely been phased out of tech work. But your older tech toys may still have it, so take care how you recycle or dispose of them.



Nickel-cadmium batteries

Cadmium

You may still have nickel-cadmium AAA rechargeable batteries around. Because of the cadmium in them, these batteries must be disposed of properly; when they can no longer carry an electrical charge, they essentially become hazardous waste.

Resistant to corrosion and good at conducting electricity, cadmium also finds use as the primary ingredient in cadmium telluride solar panels—which are cheaper to manufacture than standard silicon panels. Manufacturers use the element in electroplating, and in electronic contacts, switches, and wire insulation, too.

Aside from the random leaky battery, cadmium probably won't hurt you—assuming that your job doesn't require you to work with it directly. But for people in manufacturing or disassembly jobs, cadmium poses significant risks.

According to a United States Department of Labor report, "A vast amount of literature exists which documents the adverse health effects from acute and chronic exposure to cadmium in both humans and animals." Most of the harm comes from inhaling it; it can also be swallowed or absorbed through the skin. It can be a factor in lung cancer and can harm the liver and kidneys.

Regulated by the European Union, cadmium use is decreasing. 

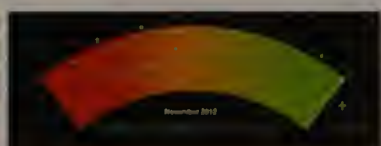
Old nickel-cadmium AAA batteries can be hazardous waste unless disposed properly.

An Online Guide to Greener Electronics

Keep tabs on how the biggest companies in consumer tech affect the environment, with the *Greenpeace Guide to Greener Electronics*, a regular report that assigns ratings to firms like HP, Sony, and Toshiba in three broad categories: sustainable operations, energy and climate, and greener products. Greenpeace judges companies on criteria such as chemical management practices and product durability, and issues a score and a rank, to encourage positive change. To download the latest edition, go to greenpeace.org.

Greenpeace Guide to Greener Electronics

November 2012



GREENPEACE

Online PDF

Here's How



Intel's NUC, wrapped in a bright red case, is about the size of a small box of chocolates.

Build a Tiny Home Theater PC With Intel's NUC

BY LOYD CASE

FULL-FEATURED PCs are becoming smaller every day, and Intel's new Next Unit of Computing is yet another example of the ever-shrinking personal computer.

At 4.6 by 4.4 by 1.5 inches,

We show you how to build a full-fledged home theater PC using Intel's surprisingly capable Next Unit of Computing.

the NUC is about the size of a small box of chocolates. It contains a Core i3 processor and two SODIMM memory slots, and you can upgrade it

with both a Wi-Fi card and an mSATA SSD internally. I was most intrigued by Intel's DC3217BY model, which includes an HDMI video con-

nectector and a Thunderbolt port for storage. The feature set made me think this NUC would be an ideal platform for building a compact media-streaming box—or even a full-fledged home theater PC.

Home theater systems are often massive beasts, and such systems are great if you want lots of storage, or want to build in a high-end 3D card for PC gaming. But the diminutive NUC seems perfectly suited for streaming video from the Internet or local server storage. You could also connect a hard drive to the Thunderbolt port, enabling the NUC to act as a DVR.

The NUC is available for about \$360, stripped down (no networking, SSD, or memory). Here's how I built mine into one of the smallest home theater PCs you will ever find.

Under the Hood

The NUC with Thunderbolt ships in a tiny, red case. Inside is the motherboard, featuring a Core i3-3217u processor. This is a low-voltage, mobile CPU clocking at 1.8GHz. Since Intel's Core i3 CPUs don't support Turbo Boost, 1.8GHz is the maximum clock speed, but the dual-core 3217u does take advantage of Hyper-Threading and can run four threads simultaneously. Even so, it has a nominal thermal power rating of just 17W. The

compact system also ships with a small, 65W power brick, similar to those included with Ultrabooks.

Although the clock speed and performance are lower than those of most desktop CPUs, one advantage of using Intel mobile CPUs, in addition to their lower power draw, is that they implement the full Intel HD 4000 GPU. This translates to better overall graphics performance. And of course, video decoding and encoding falls to the highly capable fixed-function video block inside the GPU, which Intel calls QuickSync.

Put It Together

A PC needs RAM, storage, and a way to reach the Internet. So I built a system using 8GB of DDR3 memory, a 180GB mSATA SSD, and a Wi-Fi card.

The NUC has four ports located at the back: two USB 2.0 ports, one HDMI video output, and the Thunderbolt connector. The system also has a power connection and a Kensington-compatible lock slot. A third USB 2.0 port is at the front. No analog audio connectors are included, so all audio output routes through the NUC's HDMI port.

Four small screws built into the rubber feet attach the case to its base. After removing them, you have to lift the base off to access the inter-

nals. Inside are all the user-upgradable bits, such as the SODIMM slots, and a full-size mini-PCI Express slot with support for mSATA SSDs. Underneath that slot is a half-size mini-PCI Express slot, which can accommodate an Intel Wi-Fi card. You'll also

find small screws near the two PCI Express slots. These hold down the mSATA and Wi-Fi cards, so you'll have to remove them before installing those cards.

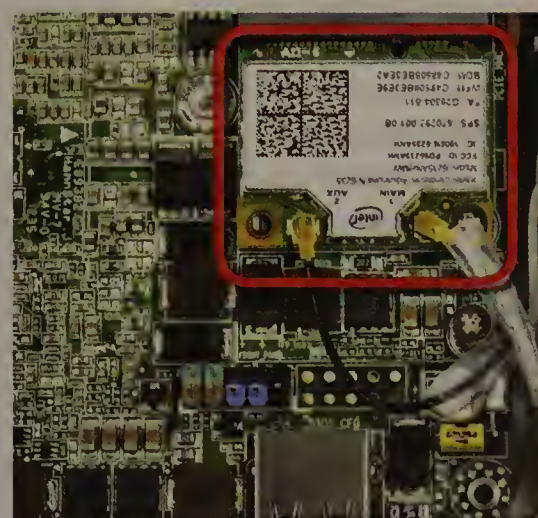
I used an Intel 520 series, 180GB mSATA SSD. It's based on MLC (multilevel cell) tech-

nology and supports 6-gbps SATA speeds. Note that you can insert any mSATA card that uses full-width mini-PCI Express, but you should avoid the half-width cards. Intel also supplied us with a Centrino Advanced-N 6235 Wi-Fi card, which supports Bluetooth. >>

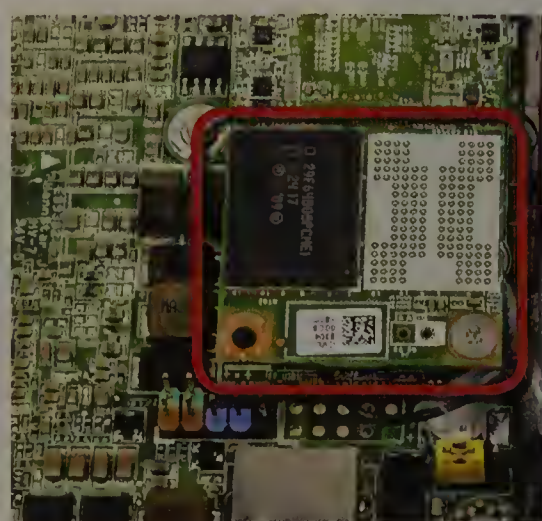
BUILDING THE HOME THEATER PC



1. This is what you see after removing the bottom plate of the NUC.



2. The antenna connectors for the Intel Wi-Fi card are tiny.



3. The SSD sits on top of the Wi-Fi card.



4. Storage, Wi-Fi, and memory all installed.

You should install the Wi-Fi card first. The antenna wire is prerouted, so all you have to do is attach the extremely small connectors to those on the Wi-Fi card. The card will stay at an angle away from the motherboard. Once it's in, slide in the SSD. You'll also want to insert the mSATA card at an angle. A small screw goes into place to hold the SSD down firmly.

As my system would be using Intel HD 4000 integrated graphics, I wanted as much memory bandwidth as I could find, which meant choosing reliable DDR3-1600 SODIMM modules. Corsair's Vengeance 8GB kit fit the bill. Insert the first (lower) module at an angle; press down toward the motherboard until it snaps into place. Repeat the process with the second module. Attach the bottom plate, and presto, you have a working PC the size of a couple of packs of playing cards.

Other Hardware

If you want additional storage, you'll need to purchase Thunderbolt-equipped exter-



Most of the ports are located at the back, as shown here. The front has one USB 2.0 port.

nal hard drives. I experimented with Seagate's Thunderbolt portable drive, also called GoFlex for Mac with Thunderbolt. It works fine with PCs carrying Thunderbolt ports. For a 1TB mobile drive, however, it's a bit pricey at about \$250, and it doesn't include a cable. Still, the whole affair mates very well with the NUC. This little portable drive can handle one or two streams well, but don't try to stream eight HD channels with audio. You'll need a full-size drive, or even a RAID array, for that.

Of course, if you plan to use the NUC primarily for streaming, then you don't need any external storage. But you do want a Wi-Fi connection with a strong signal. If you lack that, you may need to get a USB-to-ethernet dongle,

which is pretty inexpensive. All this presupposes that you have good network infrastructure wherever you decide to install the NUC.

If you want to control the system remotely, you have an assortment of wireless keyboard and mouse combinations to choose from, including Bluetooth hardware and compact keyboards with built-in touchpads. I used a Logitech Wireless Combo MK520, mostly because I had one around.

If you want HDTV-in, you'll need to add a tuner. You can use a variety of USB HDTV tuners, but I already had a SiliconDust HD HomeRun Dual, which includes two over-the-air tuners that pipe HDTV signals to computers over an ethernet network.

Operating System

I installed Windows 8 Pro, and then obtained a key from Microsoft to install Windows 8 Media Center, which is available at no cost currently for all Windows 8 users. Alternatives that work well for local streaming include the venerable (and free) VLC, and the streaming options built into Windows 8, in the form of video and music apps. They're adequate, if you're willing to

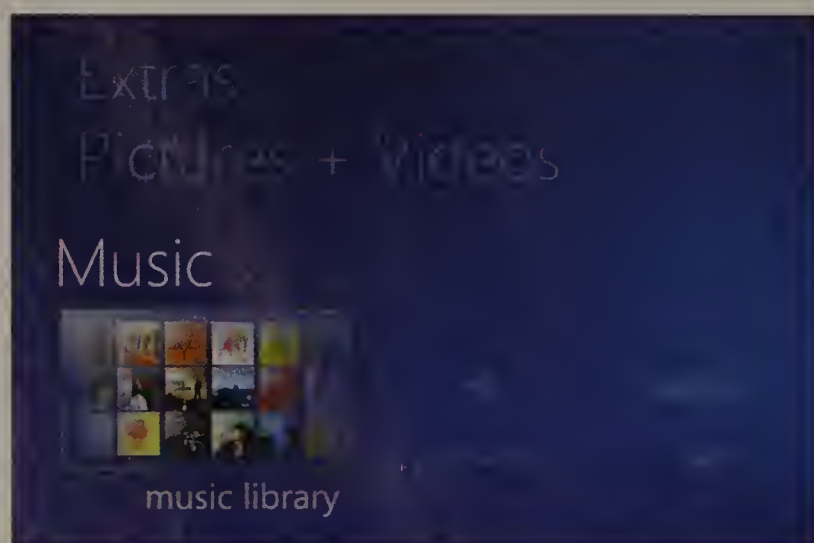
pay for content. You can also use services such as Amazon Prime, Hulu Plus, or Netflix.

Fire It Up

I connected the NUC to my Onkyo TX-NR 809 A/V receiver, and to the HDMI input labeled 'PC'. The receiver takes care of the audio processing, but routes video to an LG plasma HDTV. Windows 8 and the Intel GPU drivers detected the Onkyo as a graphics device, and everything came up roses. HD video and multichannel audio playback looked and sounded great. Standard-definition video was a touch soft looking, but acceptable.

CPU temperatures, however, seemed to hover around 60 degrees Celsius, warmer than my six-core desktop PC. The NUC also has a laptop-style cooling fan, which is noticeable mostly due to its high pitch. It's not loud, but it might bother some people.

Overall, the NUC is a surprisingly capable little box, if you are willing to work within its limitations. It's no processing powerhouse, but Intel QuickSync video works pretty well, and audio is clean. The relatively high CPU temperature and fan whine might be an issue, but only time will tell.



Windows Media Center is available to all Windows 8 users for free.

Trick Out Your PC With Multiple Graphics Cards

THE SIMPLEST WAY to make PC games look better is to buy a better graphics card. If you already have the best card, then the next step is to install a duplicate card and make them work together. Most savvy PC users have a machine with a discrete graphics card, but adding a second or third card and running them in concert can lead to a big performance boost in demanding PC games.

This job can be a little tricky, though the process has gotten much easier in the past decade. You can pair up most modern GPUs from Nvidia and AMD to work together. The cards running in multi-GPU configurations typically render alternate frames or split a frame horizontally (or into tiles), with

Upgrading a gaming system with an SLI or CrossFire multi-GPU configuration is relatively easy and worth setting up.

each GPU working on a particular portion of the frame. As a result, having multiple graphics cards can substantially increase performance. Installation is pretty simple, so let's get started.

SLI and CrossFire

Nvidia calls its multi-GPU rendering software SLI (Scalable Link Interface), and AMD calls its system CrossFire. They are fundamentally very similar.

You can link together two, three, or four separate graphics cards from the same product family within a system to distribute the workload of rendering graphics and to increase performance.

Both Nvidia GeForce and AMD Radeon cards feature one or two small edge connectors. If a card has only one of these edge connectors, then you can pair only two cards for SLI or CrossFire operation. Cards with two connectors, however, can support two-, three-, or four-card configurations.

Because SLI and CrossFire are features specifically designed to increase performance in games, they are ideally suited to gamers looking for higher frame rates.

Before You Upgrade

Here are a few things to consider should you want to upgrade a system with a multi-GPU SLI or CrossFire setup. First off, you need a motherboard that has the necessary PCI Express x16 slots and that is also compatible with

either or both technologies. You also need a case that can physically accommodate and cool the graphics cards, as well as a sufficiently strong power supply to feed the cards with adequate power. Then you have to link the cards using a bridge connector, which is usually included with either the cards or the motherboard. Finally, you need to enable the SLI or CrossFire feature in your graphics driver control panel.

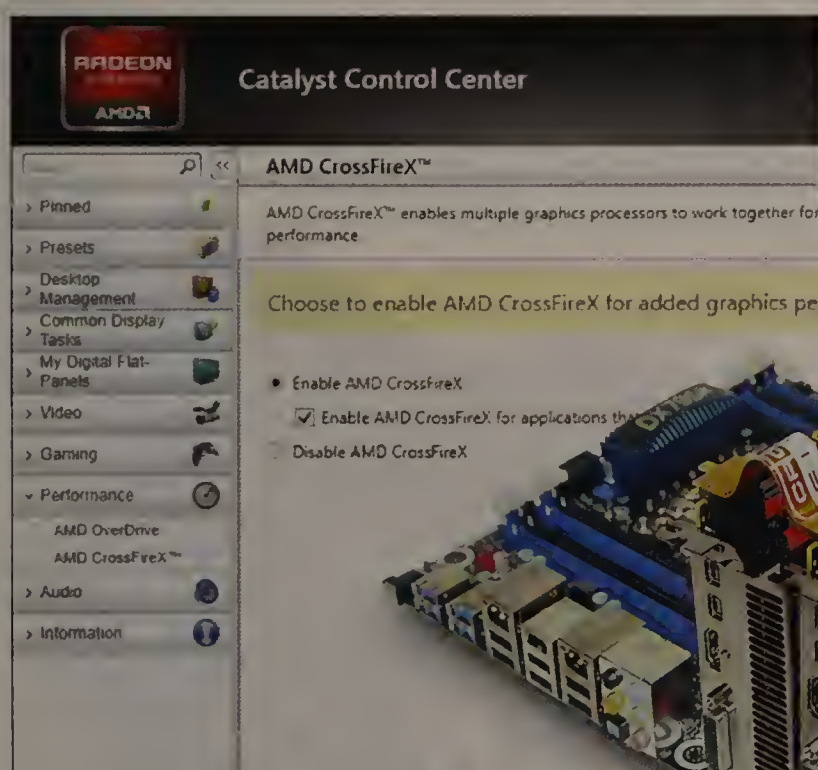
Set Up SLI and CrossFire Systems

Assuming that you have plenty of cooling, a compatible motherboard, and a power supply that can handle the extra graphics cards, installing those cards in a system for SLI or CrossFire is relatively straightforward; the process isn't much different than installing a single graphics card. Begin by shutting down the system and unplugging it from the electrical outlet. Next, insert the graphics cards into the requisite PCI

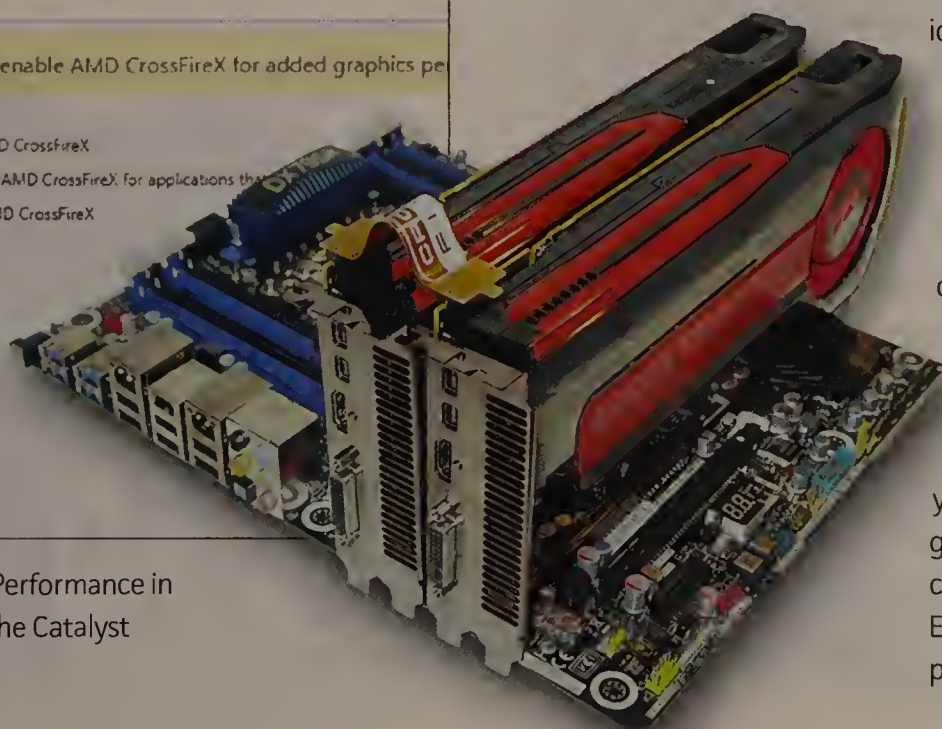
Express x16 slots on the motherboard and connect the necessary supplemental six- or eight-pin power feeds for your particular cards. Then install the SLI or

CrossFire bridge connector to link the cards.

Once everything is seated and secured, connect your monitor to the primary graphics card—typically the card installed in the PCI Express x16 slot closest to the processor on the mother- ➤➤



CrossFire settings are under Performance in the AMD CrossFireX menu in the Catalyst Control Center.

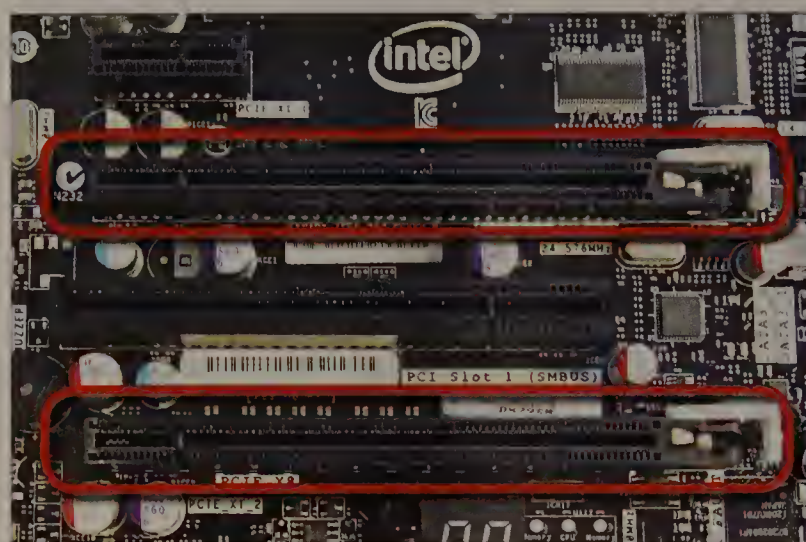


board. Then power up the machine, let the operating system boot, and install the latest drivers for the graphics cards. You may receive a notification that the system is SLI- or CrossFire-capable, and see a prompt to enable the feature. If not, simply open your graphics control panel by right-clicking a blank section of your desktop and selecting either *Catalyst Control Center* for AMD Radeon cards or *Nvidia Control Panel* for GeForce cards, and navigate to the necessary menu to enable CrossFire or SLI.

Speed and Power

What are the benefits of going through the trouble and expense of running an SLI or CrossFire multi-GPU setup? The most obvious benefit is increased performance.

A single GeForce GTX 680 card scored 3354 in 3DMark



A motherboard with the necessary PCI Express x16 slots.

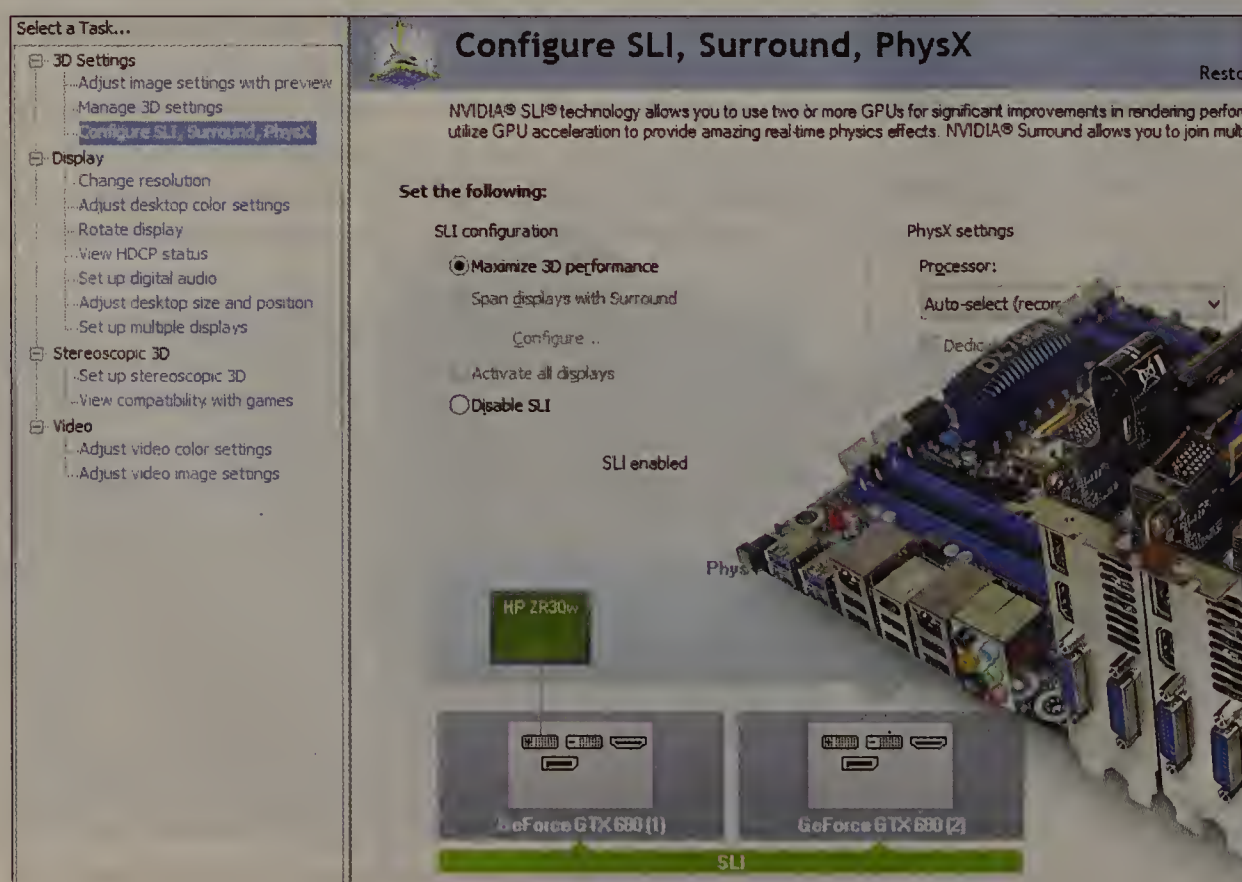
11 under the benchmark's Extreme preset, but the result jumped to 6463 after we added a second card and enabled SLI. We also ran the Metro 2033 benchmark with a single GeForce GTX 680 card, which put up 54.33 frames per second at high settings and a resolution of 2560 by 1600. Pairing two of the same cards in SLI netted 93 fps, a fantastic score. A

couple of Radeon HD 7970 graphics cards showed similar performance improvement when using CrossFire. A single Radeon HD 7970 scored 3321 in 3DMark 11 and 58.67 fps in Metro 2033 using the same settings as the GeForce cards. With CrossFire enabled, the two Radeons' 3DMark 11 and Metro 2033 scores shot up to 6413 and 99.33 fps, respectively. In addition to increased

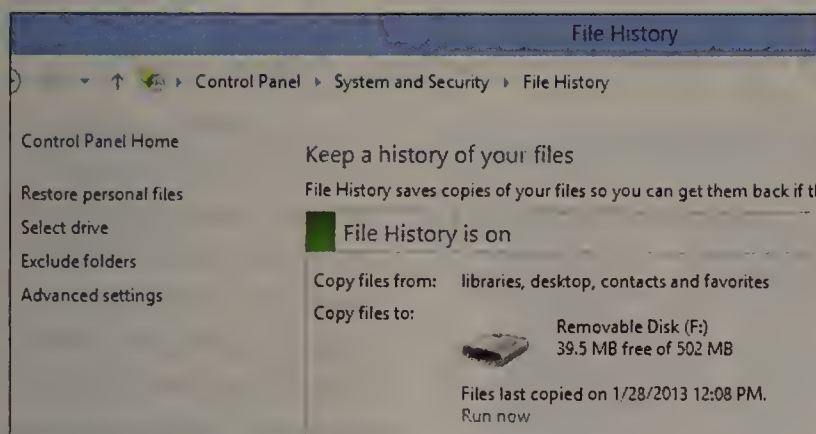
gaming performance, having multiple graphics cards in a system gives users the ability to connect more monitors, or to take advantage of the GPUs for computing tasks.

But multi-GPU configurations are not without their problems. They use more power and also pump out more heat. They're constrained by their drivers, as well: For graphical performance to scale with the extra power that an SLI or CrossFire setup affords, Nvidia and AMD must optimize their drivers and include a profile for a particular application or game. Every graphics card is only as good as its drivers, but SLI and CrossFire add another layer of complexity. Still, multiple cards are relatively easy to set up and worth the time if you have space in your case (and room in your budget).

—Marco Chiappetta



SLI settings are in the 'Configure SLI, Surround, PhysX' section of Nvidia's GeForce panel.



The hidden File History feature provides real-time backup.

Activate Windows 8's File History Feature

AS I SLOWLY learn my way around Windows 8, I continue to uncover features I didn't know existed. One such hidden perk is File History, which archives copies of older versions of your files, and does so automatically and in the background, while you work.

One caveat, though: It's not a full-system backup tool like Windows Backup. By default, it preserves only the files in your Libraries—documents, music, photos, and other media. You can add folders if you wish, but only by adding them to your Libraries.

File History also requires some kind of external storage: a USB flash drive, USB hard drive, or network drive. The more space you devote to File History, the deeper your backup will go. Here's how to get started with it.

1. Bring up the charms bar, and then click the *Search* icon.

2. Type **file history**, and then click *Settings* when it appears below the Search bar.

3. Click the *File History* link in the search results.

4. By default, the feature is turned off. Plug in whatever storage you intend to use, and click the *Refresh* icon. (If you're using network storage, click *Use network location* instead, and then choose your desired drive.)

5. Finally, click the button marked *Turn on*.

That's all there is to it. File History will create an initial backup of your Libraries, and then scan those folders once per hour and make additional backups of any new or updated files that it finds.

If you need to recover your files, just return to the File History window and click *Restore personal files*.

You can also manually navigate to the File History folder created on your storage drive, but you'll have to click through numerous subfolders to find your data.

This is a decidedly handy feature that's worth devoting, say, a flash drive to, if only to preserve your most precious documents.

—Rick Broida

ANSWER LINE

? Why am I paying for 20-mbps Internet service but getting 0.7? —*Interronator*

ALMOST NO ONE gets the Internet performance that their ISP advertises. Variables make speeds impossible to predict, and the providers advertise the best possible theoretical speed. But the difference between the advertised speed and the real speed should be reasonably close. If you're regularly getting less than 70 percent of what you were promised, you have a serious bottleneck. (If you don't know how to assess your Internet speed, visit www.speedtest.net.)

The bottleneck may be on either the ISP's end or yours. A few diagnostics may tell you who to blame.

First, try another computer. If you're getting acceptable performance on one computer but not on another, you can't blame the ISP. Next, test the way your computer connects to the router. If you're using Wi-Fi, try ethernet. If you're using ethernet, try another ethernet port, or a different cable. Also, try replacing some other cables,



LINCOLN SPECTOR



such as the one connecting the modem to the router, or the one connecting the modem to the wall. You can also update the firmware for the router and, if that doesn't

work, for the modem. If these tests don't solve the problem, try plugging the PC directly to the modem; if this takes care of the issue, consider replacing the router.

If none of these does the trick, blame your ISP. If the ISP can't fix it, consider taking your business elsewhere.

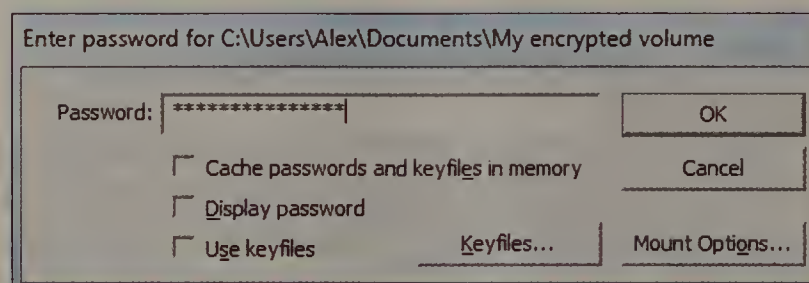
Test your Internet speed to see what you are actually getting.

Encrypt Sensitive Files Easily With TrueCrypt

A FREE, OPEN-SOURCE application, TrueCrypt lets you encrypt any file or collection of files on your PC.

To use TrueCrypt, download it at www.truecrypt.org and run the installer. The default installation options are fine, so click through to the end. Next, run TrueCrypt and click *Create Volume*. A window will pop up to walk you through the process.

On the first two screens, leave the default options checked and click *Next*. The third screen asks you to specify a volume location. This is where the encrypted data will be stored on your hard disk, so choose a location and a name that will be easy for you



Set up a password in TrueCrypt to protect your data.

to remember. To specify the location, click *Select File*, which opens a file-browser window. Unlike most file-browser windows, here you type a name in the Name field, and a file of that name is created for TrueCrypt to use.

The next screen asks for encryption settings; the defaults are acceptable, so click *Next*. After that, you have to specify a volume size. All the

files that you want to encrypt will have to fit into the volume, so make sure to allocate enough space. Then enter a password to finish the process. Follow all the instructions on the final screen, and click *Format*.

Now that you've created your volume, you can use it to store files. In TrueCrypt, click *Select File*, and choose the volume file you just made. Then,

pick a drive letter and click *Mount*. After you enter your password, TrueCrypt will create a virtual drive and your PC will treat it as if you had plugged in a real hard drive. Access it by opening the file explorer and clicking its drive letter at the left.

Drag whatever files you wish to encrypt to the virtual hard drive; when you're done, click *Dismount* in TrueCrypt. The files that you placed in the virtual hard drive are encrypted and stored inside your volume file. When you want to access these files again, simply run TrueCrypt and mount the volume file just as you did earlier.

—Alex Castle

EASY FIX: REVIVE A DEAD KEY ON YOUR KEYBOARD

HAVING A DEAD key can be terribly frustrating. Luckily, you may be able to fix the problem with some cleaning.

Shut down the PC. If it's a laptop, unplug the machine as well, but leave it open. Now turn the keyboard—or the open laptop—over, and gently tap the back. If it's a laptop, be very gentle. Concentrate, of course, on the dead key. Put the keyboard or laptop down, right-side-up.

Use a can of compressed air to spray out any dust between the keys. You can buy these cans at any computer store; I've seen them on sale online for as little as \$3. They always come with a thin straw. Use that to direct the airflow between the keys.

If you have a desktop, you can also untwist a paper clip and carefully use it to pry out dirt. But that approach is too dangerous for a laptop, where the keyboard probably sits on other, more important electronics.

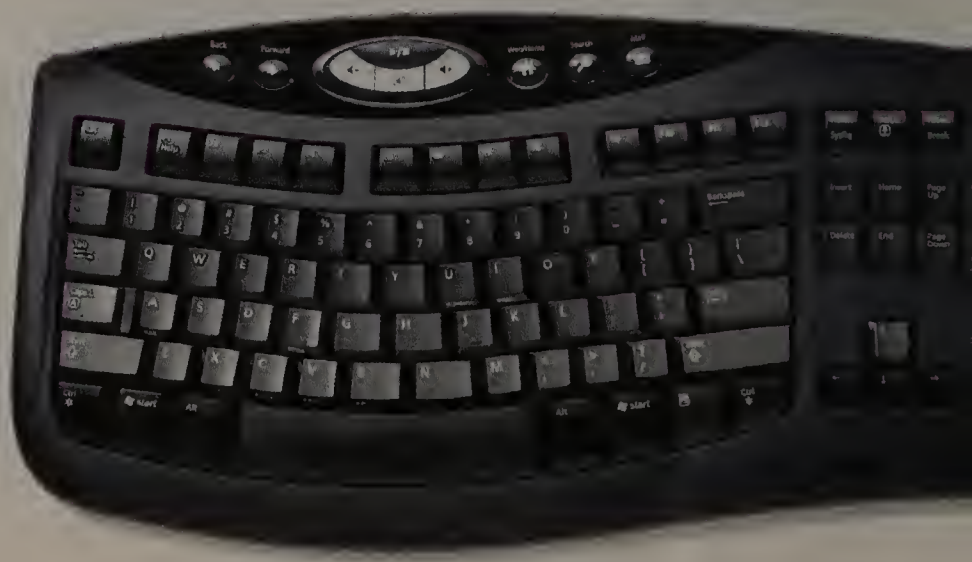
If cleaning doesn't help, you'll have to repair or replace the keyboard. If you have a desktop, just get a new one. External keyboards don't cost much (some cost less than \$10), and are easy to install.

Cleaning may help fix the dead-key problem.

Laptop keyboards, in contrast, are difficult and expensive to repair or replace. Unless you're extremely comfortable working with tiny, closely-packed circuitry, I strongly recommend that you take your laptop to a professional.

However, laptop users have one other option: Buy an external keyboard. Some, such as the Goldtouch Go Travel Keyboard, are quite small and designed for easy carrying. Your laptop will lose some portability, but not all of it.

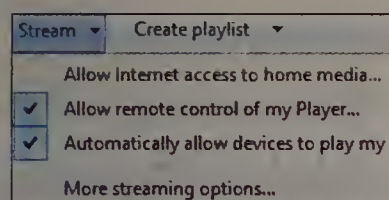
—Lincoln Spector



PHOTOGRAPH: ROBERT CARDIN

Share Media Across Your Network

IF YOU HAVE music, photos, or videos you'd like to play or view on PCs or devices such as game consoles and TVs, you'll want to set up media sharing on your Windows 8 server.



Media streaming options are in the Network and Sharing Center.

Once it's configured, you can use the 'Play To' function of Windows 8 to stream a media file to a PC or device on the network. You'll see this option when browsing files in the desktop. You can also remotely view and play media from other PCs via Windows Media Player: You'll see media libraries appear for PCs that are configured to share them. On other non-Windows devices, you may be able to browse and play your shared media.

To configure media sharing, turn on any PCs and devices you want to stream media to or from. For your Windows 8 server and other computers, open Media Player, select *Stream*, and choose *Allow remote control of my player* and *Automatically allow devices to play my media*. Then select *More streaming options*, where you can choose which devices may have access.

—Eric Geier

HASSLE-FREE PC

Convert the Format of a Kindle Ebook



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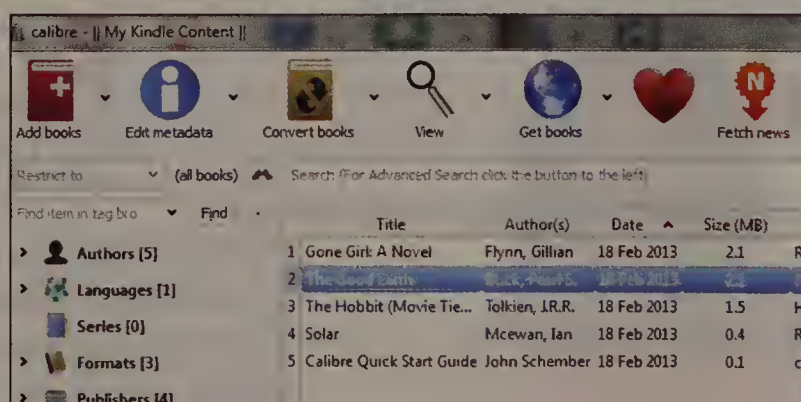
Unlock ebooks using Calibre plug-ins. Also: Start using the <Tab> keyboard key.

WHEN YOU BUY an ebook from Amazon, it's yours, right? Technically speaking, Amazon is merely licensing the ebook to you, and it can close your account and delete all your ebooks. This isn't likely to happen, but it makes me want to back up the ones I paid for, just in case. What's more, if I ever want to read those ebooks on another reader, I'd like the option of converting them to a different format. Both these

actions require the removal of Amazon's DRM—the digital lock that prevents unauthorized sharing. I have no intention of sharing. I simply want to exercise my fair-use rights.

Luckily, you can remove the DRM (at your own risk). Here are the general steps:

1. Download and install the Kindle reader program for your computer (go.pcworld.com/kindlepc). Log in and download your books.
2. Download, install, and run Calibre (go.pcworld.com/calibre). Download the plug-ins at go.pcworld.com/calibreplug. In Calibre, click *Preferences*. Under *Advanced*, click *Plugins*.
3. Click *Load plugin from file*, then navigate to where you unzipped the Calibre plug-ins. Choose *K4MobiDeDRM_v04.19_plugin.zip*, and click *Open*.



4. Open Windows Explorer and go to the My Kindle Content folder.

5. Look for files of the type 'Kindle Content'. Select them and drag them to the Calibre window.

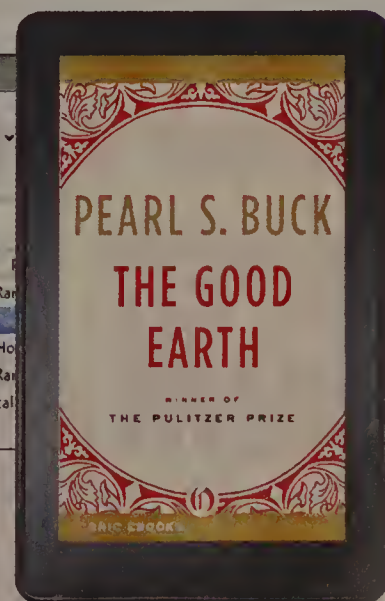
Use Calibre to remove DRM and convert the format of ebooks.

Your files should now be unlocked. If they're not in a format you like, you can right-click, choose *Convert books* > *Convert individually*, then change them to something like EPub.

The Keyboard Key You Should Be Using in Your Browser

You need to get acquainted with my good friend—the <Tab> key. With it, you can jump easily from one Web-form field to the next, no mouse required.

It works like this: When filling out an online or PDF form, use <Tab> to jump from your currently selected field to the one below it (or, alongside it). Repeat as needed until you're done. Make it a habit, and you'll wonder why you wasted so much time reaching for the mouse. By the way, pressing <Tab> moves you to the next field in any given form. If you need to move your cursor to the previous field, press <Shift>-<Tab>. 🐼



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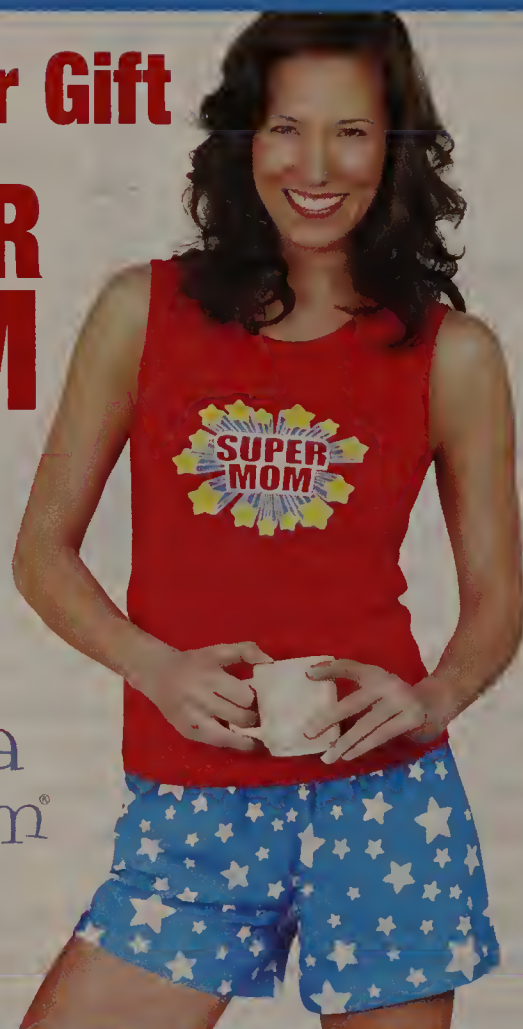
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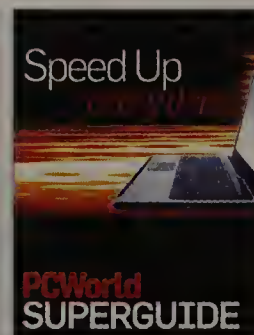
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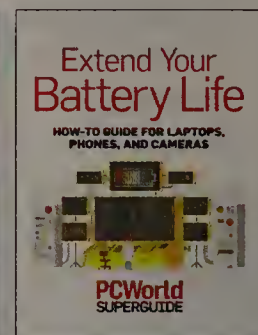
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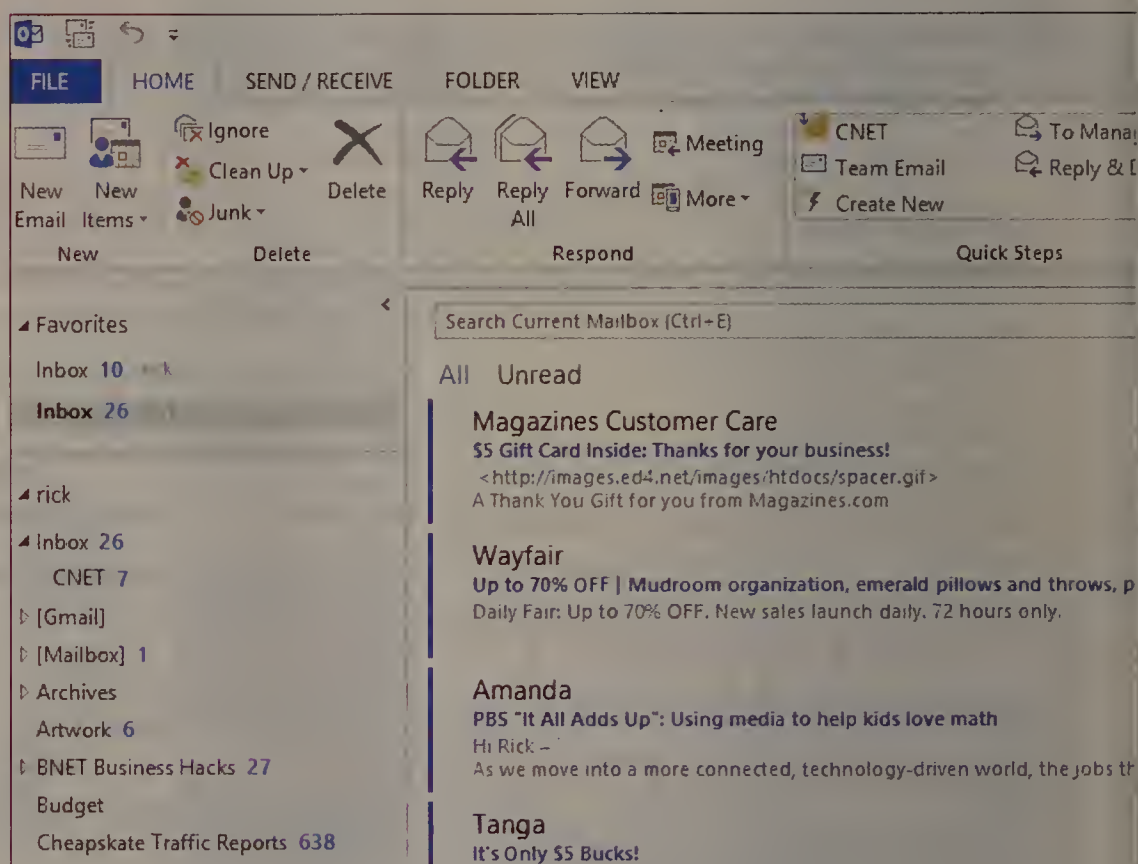


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Five Things

YOU MUST KNOW ABOUT...

Outlook 2013—part of the new Microsoft Office suite—had plenty of PCWorld editors dubious about the upgrade. But what we got was a surprisingly streamlined and powerful email program. Here are some of the best new features.



1

More Info in Less Space

Outlook 2013 has a cool new message preview feature (accessible in the View tab) that lets you preview one, two, or three lines of the message body right inside the inbox, so you don't have to open each one individually. Long-time Outlook users may balk at the extra text in the inbox, but after using the preview for a few days, you'll appreciate the speed boost that being able to skim your entire inbox gives. You can also reply to (or forward) an email right in the preview pane.

2

People in Your Email

In Gmail, a popular feature is the People pane, a little box on the right-hand side of emails that gives you more info on the person you're corresponding with. Outlook 2013 now has People Cards that provide the same benefit, collecting and displaying information your contact has chosen to share so as to make email more personal. You can see your contact's photo, phone number, company info, social media links, and more. And you can use the card to send your contact a note or an IM.

3

Zoom as Needed

The new Outlook steals a lot of great features from Word, including one of our favorites: the Zoom slider. Now available in the lower-right corner of the preview pane, it lets you make quick and easy adjustments to the zoom level for the message you're viewing. However, this zoom setting has annoying limitations: It currently doesn't carry over to other messages in your inbox, and if you click away from one zoomed email and then click back to it, your zoom setting is lost.

4

Customize to Taste

Like the PC, Outlook has a long legacy of forcing you to look at a drab gray box while you're doing your work. The new Outlook is still a powerful business tool, but now you can customize it to match your personal style with a few visual flourishes, including about a dozen themed backgrounds (calligraphy, clouds, stars, and so on), plus three color schemes. It may seem to be a small touch, but it's much easier to stay productive and focused on your inbox when it's easy on the eyes.

5

Attachment Reminders

Borrowing a page from Gmail—and obviating the third-party plug-ins that Outlook users formerly had to install—Outlook 2013 can now parse the text of your email message and warn you when it appears that you've forgotten to include an attachment referenced in the body of your message. Like the customized visuals, it's a small thing, but if you're constantly on the receiving end of "You forgot the attachment!" emails, this feature should come in mighty handy. ●



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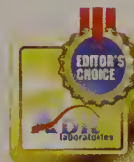
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